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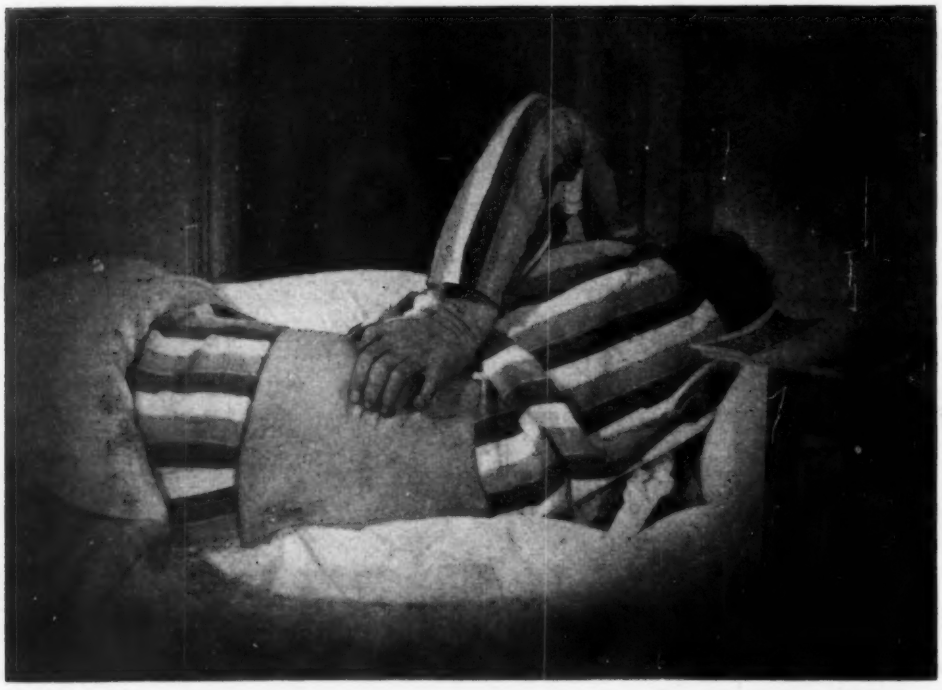

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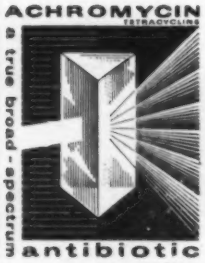

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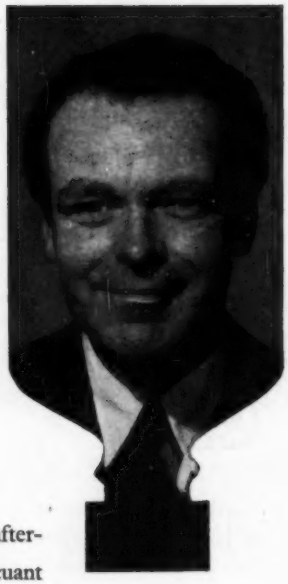

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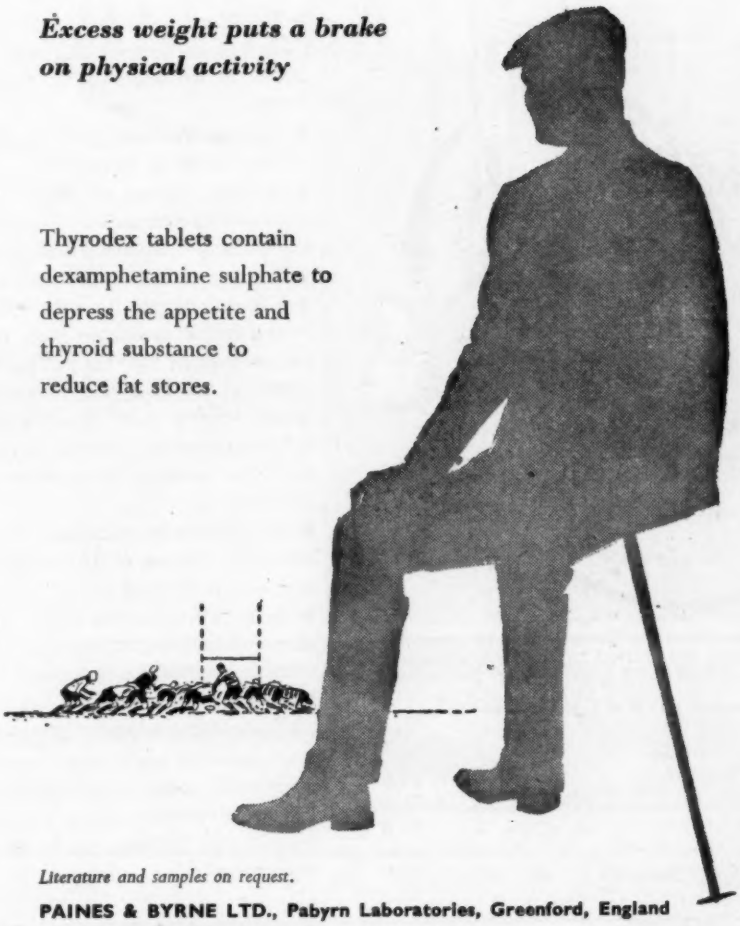

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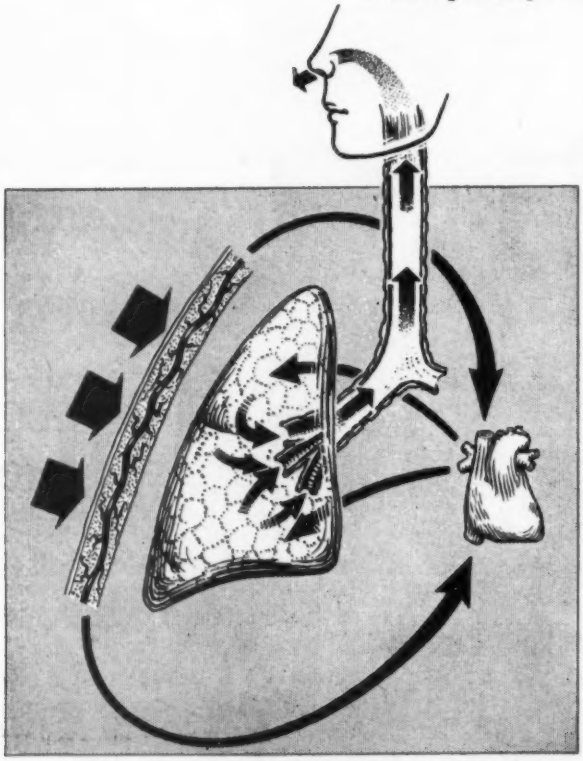

This diagram shows how Thoracin components penetrate the skin, are carried by the bloodstream to the alveoli and excreted there to exert their effect.

FORMULA

Phenyl Ethyl Nicotinate	2.0% w/w
Guaiacol Furoate	5.0% w/w
Tetrahydrofurfuryl Salicylate	10.0% w/w
Camphor	3.0% w/w
Eucalyptol	2.0% w/w
Water-Miscible Base to	100.0%

▶ The Thoracin formula is based on the same principles that have made Transvasin so successful in the treatment of rheumatic conditions.

▶ Thoracin is composed of esters of substituted hydroxy aromatic derivatives.

▶ Thoracin achieves the effect of the classic counter-irritant remedies — poultices, plasters and cupping — without irritation of the skin.

▶ Thoracin contains a new ester of Guaiacol that is entirely free from the evil smell and irritant effect associated with this phenol derivative in its pure form. This ester easily penetrates the skin, and is excreted in the alveoli, where it exerts its well-known action.

▶ Thoracin ensures vasodilation of the superficial skin vessels by the use of esters of nicotinic acid.

▶ Thoracin relieves reflex spasm of the pectoral muscles by the use of the tetrahydrofurfuryl-ester of salicylic acid.

▶ Thoracin brings to the alveoli via the blood stream the sedative, antispasmodic, and expectorant properties of camphor and eucalyptus.

THORACIN is available in 1 oz. tubes — basic price 2/6 plus 7½d. P.T. It is an ethical product, and is not advertised to the public. Since a very small quantity is sufficient for each application, the cost of treatment is extremely low. *Samples and literature will be gladly sent on application.*

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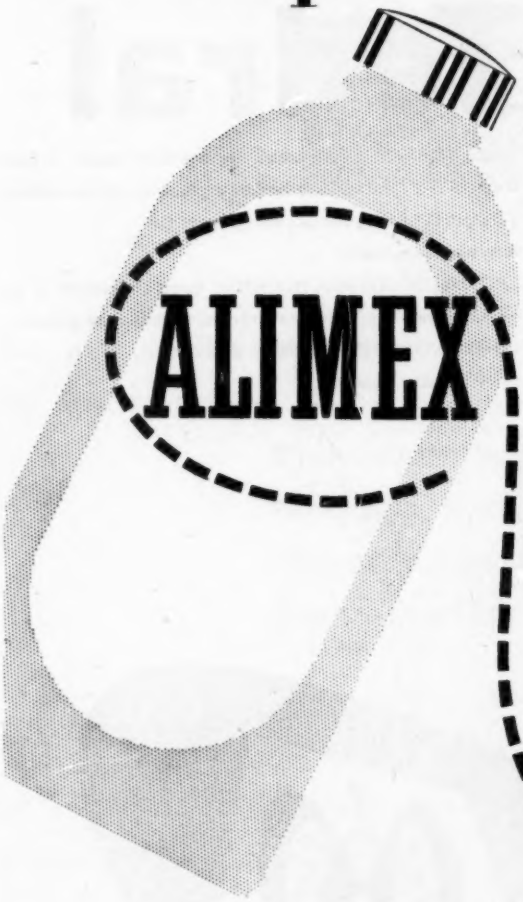

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MAXIMAL ACID-BINDING EFFECT

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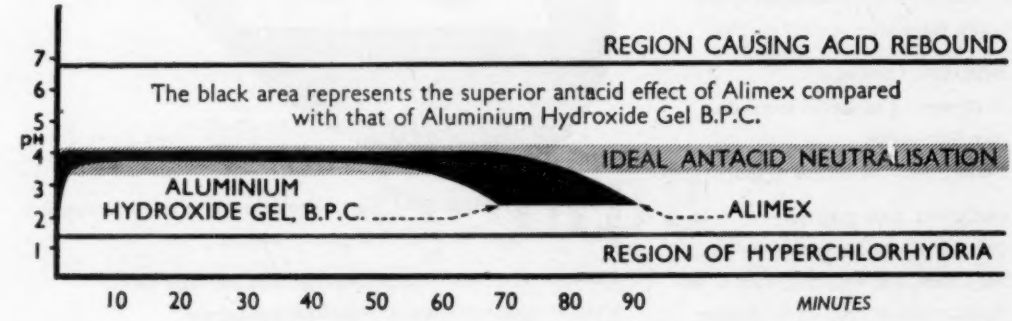

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S.215

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THEOPHYLLINE, to relax the spasm of the bronchial musculature.

EPHEDRINE HYDROCHLORIDE, to relieve oedema of the bronchial mucosa in addition to relaxing the bronchial muscles.

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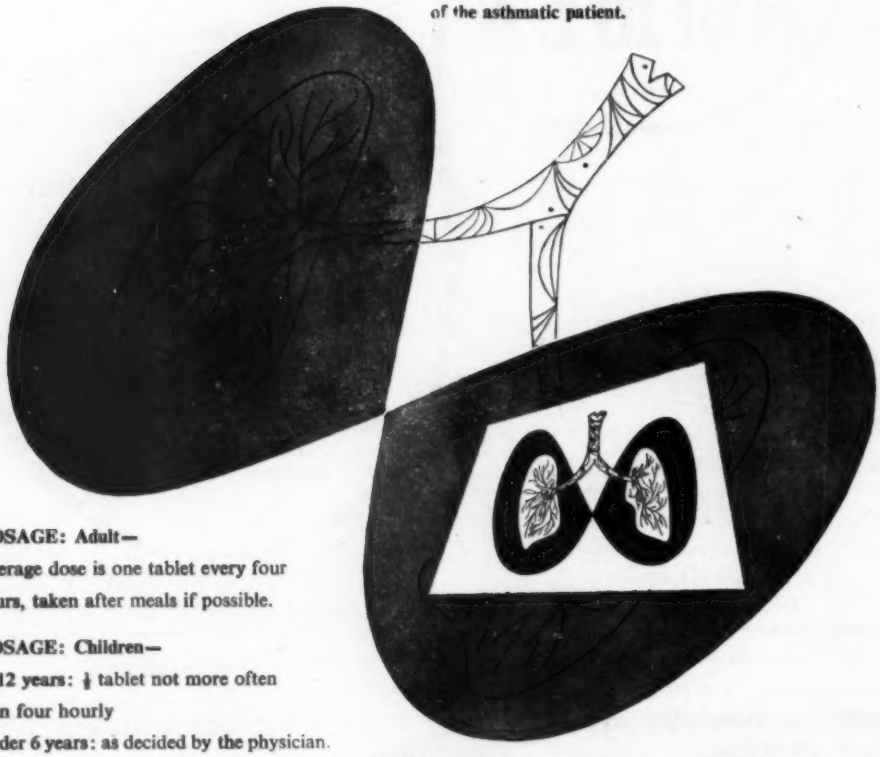

DOSAGE: Adult—
Average dose is one tablet every four hours, taken after meals if possible.

DOSAGE: Children—
6-12 years: ½ tablet not more often than four hourly
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PACKING AND PRICES:
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TEDRAL ENTERIC COATED is also available to give symptomatic relief of asthma four hours after administration.

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"... all the patients in the series developed a vigorous sense of well-being which contrasted very strikingly with their previous chronic ill-health." [3]

"From the present series it appears that this new iron-dextran complex is a notable advance in the treatment of the iron deficiency of pregnancy." [4]

1. LANCET, 1954, *2*, 942.
2. B.M.J., 1954, *2*, 1257.
3. B.M.J., 1954, *2*, 1255.
4. LANCET, 1954, *2*, 1245.

IMFERON IS THE FIRST EFFECTIVE IRON PREPARATION FOR INTRAMUSCULAR INJECTION

IT PROVIDES the rapid, reliable response of an order hitherto only obtainable with intravenous preparations; and it takes much less time to administer.

IMFERON IS indicated for the patient who is refractory to, or intolerant of, oral iron; and when a rapid response is required, as in anaemia of pregnancy.

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"IT WAS OBVIOUS during this study that the skill and care of the person giving the injections does much to minimise local discomfort and staining, and it is significant that only two patients failed to attend for further injections." (LANCET, 1954, *2*, 1245).

AMPOULES *2 ml. (100 mg. Fe) boxes 10 and 100*
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FULLY-DESCRIPTIVE LITERATURE, including dosage Calculator, on request. A Technical Information Service is at your disposal.

IMFERON IRON-DEXTRAN COMPLEX
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Dihydroergotamine methanesulphonate	0·16 mg
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Sodium isobutyl allylbarbiturate	25·0 mg.

Dosage

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Tubes of 20 and 200 tablets.

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Ferrous Gluconate for the treatment of IRON DEFICIENCY ANAEMIA

FERROUS GLUCONATE has been shown to be more effective than ferrous sulphate in restoring a normal blood picture and is much less liable to cause side effects especially in the gastro-intestinal tract.

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FERLUCON ELIXIR is particularly suitable for children and infants, and extensive laboratory investigations have confirmed its high stability. Enquiries instituted have so far failed to bring to light any cases of poisoning of children with ferrous gluconate.

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TABLETS OF 0·3G. FERROUS GLUCONATE (EVANS)

BOTTLES OF 25, 100 AND 250 TABLETS

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local antibiotic therapy—with minimal risk of sensitisation

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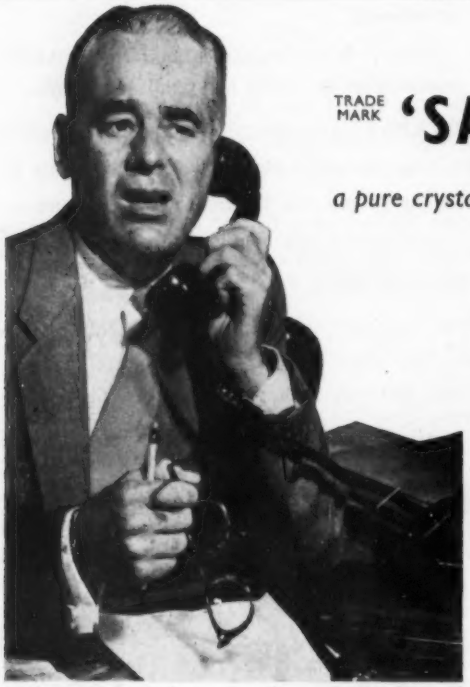

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a pure crystalline alkaloid obtained from species of Rauwolfia

.... relieves mild to moderately severe labile hypertension.

.... induces a state of mental quietude and relaxation. Is of great value to those patients who may be considered candidates for one of the common stress diseases, whether or not hypertension is present.

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THE URÆMIAS*

G. M. BULL
M.D. Cape Town, F.R.C.P.
PROFESSOR OF MEDICINE IN THE QUEEN'S UNIVERSITY, BELFAST

THE word uræmia means urine in the blood and was first used by Piorry and Lhéritier in 1840 to indicate the intoxication resulting from insufficient purification of the blood by the kidneys. It is unfortunate that it is such a short and descriptive word, for it sounds as if it indicates one definite clinical picture. In fact it does not.

In renal failure one may see a very wide variety of symptoms and signs which, even on Piorry's definition, could be included as uræmic. With improving biochemical knowledge it has become possible to attribute some of these to measurable deviations from the normal body chemistry. I shall aim to review some of the progress in this field, and to show how a better understanding of the pathogenesis of the uræmias may lead to rational treatment.

Definition

The uræmias are those states which occur when the kidneys are unable to maintain a normal internal environment, and arise when there is an imbalance between the rates of intake or production in the body of chemical substances and their rates of excretion.

This definition emphasises three important points:

(1) There is no single clinical picture in renal failure.

(2) The uræmias arise from an imbalance between intake and renal function—a concept of great importance in treatment.

(3) Uræmia includes those states which arise from failure of the kidney to conserve essential substances as well as states due to retention of urinary constituents.

PATHOGENESIS OF SYMPTOMS AND SIGNS IN THE URÆMIAS

Contrary to earlier beliefs, the most important substances in the genesis of the uræmias are not the organic end-products of nitrogen metabolism, but water and electrolytes.

Some of the uræmias can be attributed to detectable deviations from the normal chemical content of the body, and can be recognised by clinical and laboratory methods. These will be described first. Others remain unexplained and will be considered more briefly later.

Although each uræmia is described as though it were a separate entity, it should be remembered that mixed varieties are the rule. In each case are outlined the mechanisms of production, then the clinical recognition, and finally the laboratory diagnosis.

Symptoms and Signs Attributable to Known Biochemical Abnormalities

ACIDÆMIA

Acidæmia develops when the ratio of strong anion to fixed base rises. This may occur in renal disease for the following reasons:

1. The intake of anion (particularly chloride, phosphate, and sulphate) may exceed the capacity of the kidney to excrete it.
2. Fixed base may be lost owing to a defect in renal base-sparing mechanisms.
3. Fixed base may be lost in diarrhœic stools.

The clinical picture is dominated by the deep sighing respiration, and this is accompanied by various degrees of clouding of consciousness progressing to coma.[1] Other symptoms frequently occur in acidæmic patients, but whether they are the result of the acidæmia, or due to associated disturbances, is difficult to say. The most common accompaniments are restlessness, headache, and nausea, and occasionally there is meningism.

The diagnosis is confirmed by determination of the plasma-bicarbonate ($-HCO_3$) level, which is reduced in metabolic acidæmia. This level is similarly reduced in respiratory alkalæmia from hyperventilation, but in this latter the pH is raised, and tetany (overt or latent) can be demonstrated. Tetany does not occur in acidæmia, for reasons which are discussed on p. 732.

Although incorrect in a strict chemical sense, it is convenient to regard the reduction of the plasma-bicarbonate level as a deficiency of fixed base in the body, even where the cause is the presence of fixed anion in excess. This is so because, in treatment, we have to provide a quantity of strong cation to correct the disturbance. Although we sample only the plasma, this deficiency of fixed base is found throughout body-water—information which is useful in calculating the quantities of base to be given in treatment.

ALKALÆMIA

Alkalæmia is rather uncommon in renal failure, and here, as in other circumstances, it is almost always associated with potassium deficiency. That potassium deficiency is an important cause has been shown by Orloff et al. (1953). The alkalæmia arises in most cases because of vomiting, with its attendant loss to the body of chloride and potassium, but it is occasionally seen when there is a very high intake of alkali.

The clinical picture is usually dominated by tetany, caused indirectly by a fall in the level of ionised calcium. (The reasons for this are discussed on p. 732.) Some symptoms, however, probably arise from the alkalæmia per se: these include stupor, headaches, and changes in temperament—or even psychosis. Some patients notice a dislike of sweet foods.

Estimation of the plasma–HCO_3 level confirms the diagnosis. A rise in $-HCO_3$ is found in metabolic alkalosis, but also in respiratory acidosis. To distinguish between these two, we may estimate the blood pH, but in practice this is unnecessary because in metabolic alkalosis there is tetany (latent or overt), and in respiratory acidosis there is central cyanosis.

HYPERPOTASSÆMIA

Little is known of the rôle of changes in cellular potassium content in renal failure, and the main clinical importance of the potassium ion is that changes in its concentration in extracellular fluid sometimes give rise to symptoms and signs, and may cause death. Hyperpotassæmia occurs in the following circumstances:

(1) Potassium intake may exceed the capacity of the kidney to excrete it. The reprehensible practice of administering potassium citrate as a diuretic in acute nephritis, and its routine administration to all patients receiving sulphonamides, must have caused many fatalities in this way.

(2) Potassium may be released from its protein binding in cells during katabolism, and then migrate into the extracellular space. This occurs particularly when the rate of katabolism is high, as in anuric patients receiving too few calories in the diet, and in those with infections. It also occurs in underhydrated patients. Here the reason is probably as shown in fig. 1. This variety of hyperpotassæmia may be seen even in the presence of a deficiency of potassium in the body as a whole, and it is almost always seen in extracellular underhydration.

It is unfortunate that in most patients there are no presenting symptoms and signs of hyperpotassæmia. The patient dies suddenly of cardiac arrest. Very rarely indeed, hyperpotassæmia may be accompanied by a

* The Goulstonian lectures for 1955, delivered before the Royal College of Physicians of London on Jan. 18 and 20. Based on work done with Dr. A. M. Joekes, Dr. K. G. Lowe, and Miss B. M. Evans at the Postgraduate Medical School of London, and with Dr. R. N. Beck, Dr. R. A. Womersley, and Miss E. Martin at Queen's University and Royal Victoria Hospital, Belfast.

flaccid hyporeflexic generalised paralysis, clinically indistinguishable from that which may occur with hypopotassæmia. We certainly cannot afford to await the development of paralysis, and the diagnosis of hyperpotassæmia must be suspected from the attendant circumstances, and confirmed by estimating the serum-potassium level. Where this is not possible, an electrocardiogram may be of assistance, because a very rough correlation exists between the serum-potassium level and the electrocardiographic pattern.

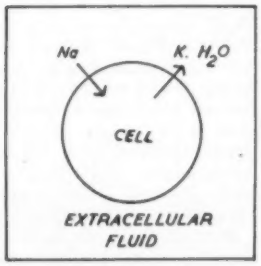

Fig. 1—Effect of lowering partial pressure of oxygen on cell water, sodium, and potassium.

The oligæmia resulting from underhydration causes a reduction in the general circulation, which in turn causes a fall in partial pressure of oxygen in the tissues and a reduction in renal function—circulatory renal insufficiency. When the partial pressure of oxygen falls, potassium is released from the cells and passes into the extracellular fluid (Mudge 1951, Robinson 1953), where its concentration increases, because its excretion is impaired by the circulatory renal insufficiency.

POTASSIUM DEFICIENCY

A deficiency of potassium arises when there is a combination of a low intake of the ion with excessive loss either through the kidney or through the gut. It is seen characteristically in the following circumstances:

(1) In the early diuretic phase of tubular necrosis, where it is presumably due to a defect in tubular reabsorption of potassium (Bull et al. 1950).

(2) The same type of defect may be seen rarely in chronic renal disease (Bickel et al. 1953, Brown et al. 1944, Evans and Milne 1954).

(3) Potassium deficiency also arises because of loss of the ion, in excess of intake, in vomitus or in diarrhœic stools, both of which contain considerable quantities of potassium.

Clinically, the hallmark of hypopotassæmia is a flaccid areflexic paralysis, indistinguishable, on neurological examination, from family periodic paralysis. However, gross deficiencies of potassium may occur without this paralysis. Usually in potassium-deficient patients there is some clouding of consciousness, but whether this is due to potassium lack or to associated disturbances is uncertain.

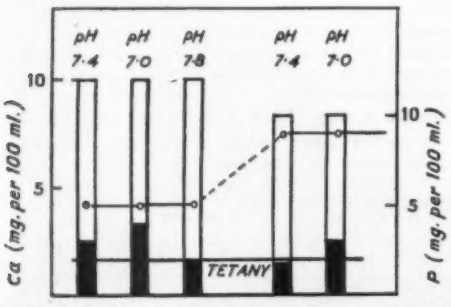

Fig. 2—Effect of pH and serum-phosphate level on plasma-ionised calcium level.

The proportion of total serum-calcium level due to ionised calcium is shown in black. In acidæmic patients (as in columns 2 and 5) the proportion ionised increases, and in alkalæmic patients (as in column 3) it decreases.

A rise in serum-phosphate level above the normal (as in columns 4 and 5) is associated with a reciprocal fall in serum-calcium level. At a normal pH this may cause tetany, but column 5 shows how acidæmia prevents the development of tetany by raising the proportion of calcium ionised.

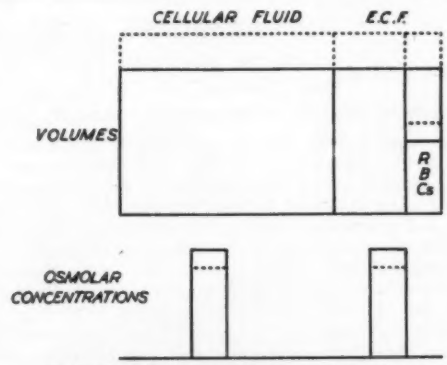

Fig. 3—Cellular and extracellular overhydration.

For comment, see text. In this and subsequent similar figures the solid line represents the normal, and the dotted line the abnormal.

The diagnosis may be confirmed by determining the serum-potassium level or by electrocardiography. Unfortunately I do not know of any simple method of estimating quantitatively the extent of the deficiency of potassium in the body as a whole.

DISTURBANCES IN CALCIUM LEVEL

The level of ionisable calcium in the extracellular fluid may be altered in renal failure. The most important causes of these alterations are changes in the plasma pH and the plasma-inorganic phosphate concentrations. Their effect is shown in fig. 2.

The serum-inorganic phosphate level rises in parallel with azotæmia when the glomerular filtration-rate is

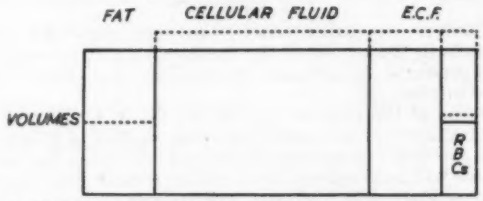

Fig. 4—Cellular and extracellular overhydration caused by formation of water from metabolism of fat in anuria.

For comment, see text. Fat is converted to water and causes all three body-water compartments to expand.

reduced. Secondary to this, there is a fall in absolute level of serum-calcium.

Many patients with renal failure have a low total-calcium level in the plasma but are protected from the effects of this by acidæmia, which maintains the ionised fraction at near normal levels. If the acidæmia is corrected without a fall in the inorganic phosphate of the plasma, they develop tetany. Lowering of the level of ionised calcium is one of the causes, though not a common one, of twitching and generalised epileptiform convulsions in renal failure.

Hypercalcæmia is very uncommon in renal failure, and where it occurs it is usually the cause rather than the result of the failure, as in vitamin-D intoxication, sarcoidosis, hyperparathyroidism, and myelomatosis.

DISTURBANCES OF MAGNESIUM CONTENT OF THE BODY

Hypermagnesæmia occurs occasionally in renal failure when the intake of the ion is particularly high and the rate of excretion low. It is usually the sequel to administration of magnesium sulphate as an aperient. The

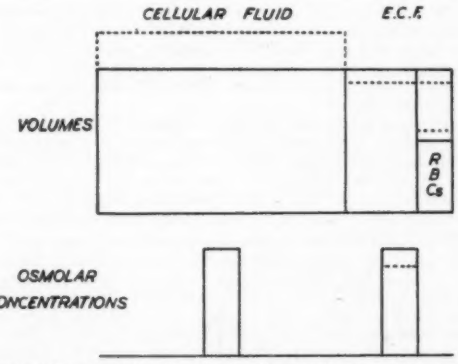

Fig. 5—Cellular overhydration due to decreased extracellular osmolarity.

For comment, see text.

clinical effect is the same as the administration of a sedative.

Magnesium deficiency is found in the early diuretic phase of acute tubular necrosis, but no clinical picture can yet be attributed to it with certainty.

DISTURBANCES OF WATER BALANCE

Last among the known disturbances considered are those affecting water balance. These are less well known than the others, but of greater importance. They probably cause more deaths than all the others combined.

Four types may be recognised—cellular overhydration and underhydration, and extracellular overhydration and underhydration—and various combinations of these occur.

Cellular Overhydration

Cellular overhydration is a common disturbance. It occurs especially in the anurias, but it may also be seen in chronic renal failure and in certain types of circulatory renal insufficiency. The main factors determining its occurrence are (1) a discrepancy between intake and output of water, and (2) the osmotic pressure of the body-fluids, which is in turn affected by intake and output of electrolyte.

The following examples illustrate how these factors operate:

The fluid intake or the rate of production of water from fat, carbohydrate, and protein may exceed the rate of fluid loss from the body, leading to an expansion of all body-water compartments and a fall in the concentration of their solutes (fig. 3). This is commonly seen in the anurias. When the rate of water intake is very high, patients with chronic renal failure may develop cellular overhydration by this same mechanism.

I once had a patient with chronic renal failure who unwisely drank 5 litres of water in about an hour. He became nauseated and confused very soon afterwards. His volume of urine increased sharply for about half an hour and then decreased to oliguric levels. He died about four hours later.

Funck-Brentano (1953) has studied this phenomenon of oliguria in cellular overhydration and believes that swelling of renal cells may account for the deterioration in renal function. Even if this explanation is incorrect, it is important to recognise that cellular overhydration is dangerous for this reason, as well as for others.

In treating anuric patients it seems at first sight that by keeping the total body-weight constant we could avoid overhydration. Hamburger and Mathé (1954) point out that this is not so, because the katabolism of fat and tissue releases water which enters the fluid compartments of the body and so alters the ratio of dry weight to total weight. Each gramme of fat burnt releases about 1·25 ml. of water. The mechanism is illustrated in fig. 4.

The osmolarity of extracellular fluid may fall and allow water to diffuse into the cells (fig. 5). Na and Cl are the commonest extracellular ions and contribute most of the osmotic pressure of extracellular fluid. If for any reason the concentration of these ions, especially Na ion, is low, the osmolarity of the extracellular fluid decreases, and water tends to move along an osmotic gradient into the cells, until osmotic equilibrium has been regained.

The sodium content of the body may be low because of reduced intake, as in patients on low-salt diets, but the usual cause is undue loss of the ion. This may take place through diarrhœa, vomiting, or sweating, or, most important, through the kidney. This renal loss of Na is of special importance because it occurs very commonly in both acute renal failure (Bull et al. 1950) and chronic renal failure (Nickel et al. 1953). Fig. 6 shows how extensive the loss may be in acute tubular necrosis, and fig. 7 in chronic renal failure.

In my experience, this uncontrolled salt loss is invariable in the early diuretic phase of acute tubular necrosis. In chronic renal disease it is also very common. I believe that it occurs to some extent in nearly 50% of patients, although it is rare in the gross form described by Thorn et al. (1944), which simulates Addison's disease.

Mechanism of salt wasting.—There are two main reasons for loss of salt in renal disease.

(1) If, in a normal person, we induce an osmotic diuresis—e.g., by injection of mannitol or by ingestion of urea—the volume of urine increases and with it the excretion of Na (figs. 8 and 9).

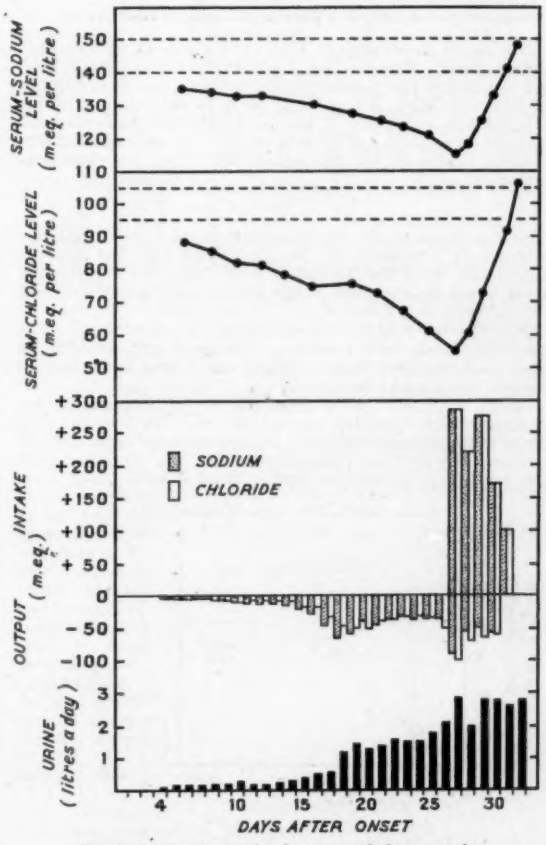

Fig. 6—Renal salt wasting in acute tubular necrosis.

This was a patient whom we treated before we understood the renal disturbance in tubular necrosis, and a salt-free diet was administered for far longer than is desirable. There was a considerable loss of Na and Cl in the urine, and in consequence the serum-Na and serum-Cl levels fell very low, until large quantities of these ions were administered.

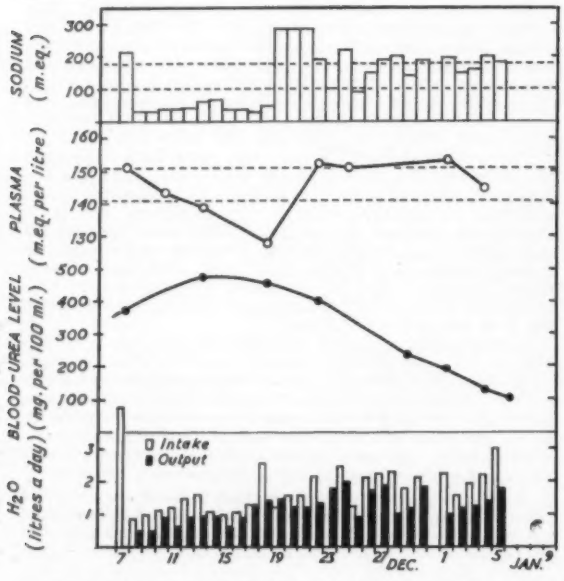

Fig. 7—Salt wasting in a patient with chronic renal failure.

The figure shows sodium wasting in a patient with chronic renal failure. Between Dec. 7 and 19 the serum-sodium level fell well below the normal range despite an intake of sodium of about 50 m.eq. a day, equivalent to an intake of about 3 g. of salt per day. A normal person can maintain salt balance on an intake of a tenth of this. To maintain balance a large intake of sodium (about 200 m.eq. per day) was required.

It has been shown by Rapoport et al. (1949) that the change in excretion of Na and H_2O can be directly correlated with the excreted load—i.e., the number of mols of solute excreted in the urine—and is independent of the type of solute.

Where the number of nephrons is reduced and the excreted load kept constant, the load per nephron is increased, and this has the same effect as a high over-all load in a normal person.

Thus, a patient with renal disease, in balance on an ordinary diet, excretes per minute the same amount of urea and other osmotically active solutes as a normal person, but through fewer nephrons. The excreted load per nephron is therefore higher than normal, and these patients are, in fact, in a constant state of osmotic diuresis. They excrete more Na than they should, and have a constant polyuria.

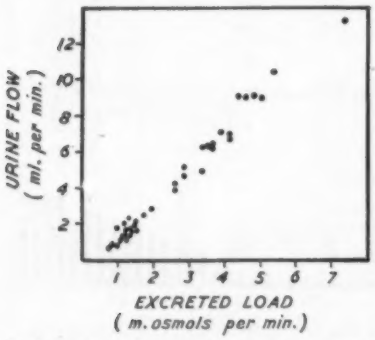

Fig. 8—Relationship between excreted osmotic load or milliosmols of solute excreted per minute and the volume of urine in healthy people on restricted intake of fluids.

The volume of urine increases with increasing osmotic loads. (Unpublished data from a study undertaken with Dr. Beck.)

As Fremont-Smith et al. (1931), Homer Smith (1951), and Platt (1950) point out, this osmotic diuresis may also explain the isosthenuria of renal failure, for the following reason:

If we administer an osmotic load to a hydropenic patient excreting concentrated urine, we find, in addition to a diuresis, a decrease in the osmolarity of the urine towards that of the plasma, which is about 310 milliosmols per litre. Similarly, an osmotic load in an overhydrated patient passing dilute urine increases the osmolarity of the urine (fig. 10).

As the osmolarity and the specific gravity of the urine can be approximately correlated, it is easy to see how an increased osmotic load, even in a normal person, contracts the possible range of specific gravity of the urine, until eventually it becomes fixed at 1·010, or 310 milliosmols per litre. In renal disease the same effect is brought about by a reduction in the number of nephrons.

(2) Another reason for the Na loss in renal failure is that, where the base-sparing capacity of the kidney is reduced, as in renal failure, fixed base, particularly Na, is excreted in increased amounts when the patient is acidotic. As most diets are acidifying, this becomes a factor in increasing the drain of Na from the body. Isolated abnormalities of the tubules exist in which it is the only cause of Na wasting.

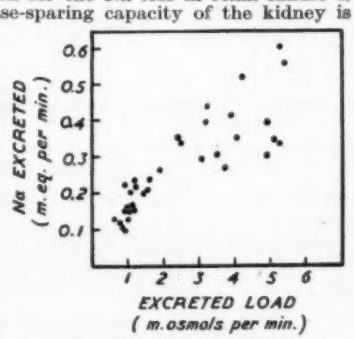

Fig. 9—Relationship between excreted osmotic load or milliosmols of solute excreted per minute and the urinary excretion of Na by normal persons.

The excretion of Na increases with increasing osmotic load. (Unpublished data from a study undertaken with Dr. Beck.)

Clinical recognition of cellular overhydration.—The presence of cellular overhydration may be suspected when the history and examination suggest any of the circumstances mentioned. The symptoms and signs of cellular overhydration (modified from Hamburger et al. 1950) are as follows:

Clinical:

Anorexia.	Changes of mood.
Nausea.	Coma.
Vomiting.	Epileptiform convulsions.
Lassitude.	Muscle cramps (unusual).
Stupor and confusion.	

Laboratory:

Low serum-Na level.

Low mean corpuscular Hb concentration and high mean corpuscular volume.

Note that the first five of these may aggravate the condition by diminishing Na intake or by increasing its loss.

Laboratory tests which assist the diagnosis include the determination of the plasma-Na level, which is low; the mean corpuscular hæmoglobin concentration, which is low; and the mean corpuscular volume, which is high

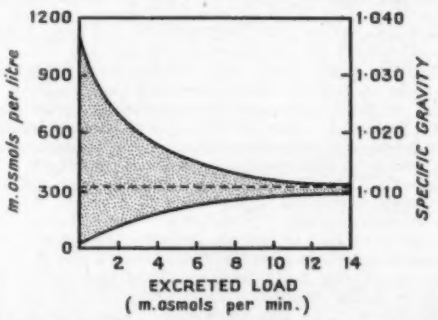

Fig. 10—Effect of osmotic load on concentration and dilution of urine.

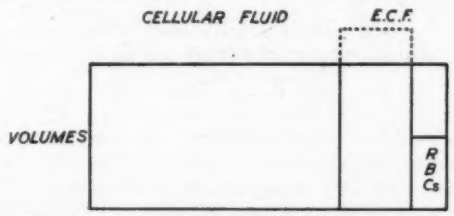

Fig. 11—Expansion of extracellular space without increase in volume of plasma.

because the red cells, in common with other body cells, are overhydrated.

A low value for the plasma-Na level is not pathognomonic of cellular overhydration, and can occur with normal cell hydration in nephrosis and other protein-deficiency states.

Extracellular Overhydration

Two varieties can be distinguished.

Pure expansion of extracellular space without increase in volume of the plasma (fig. 11)—e.g., nephrosis. Here the symptoms and signs are those of the œdema alone.

Expansion of extracellular space with increase in plasma volume (fig. 12).—This is more serious. It occurs in congestive heart-failure, following excessive administration of adrenocortical hormones, and in renal disease when water and salt are given in excess of the ability of the kidney to excrete them. A good example of the last type

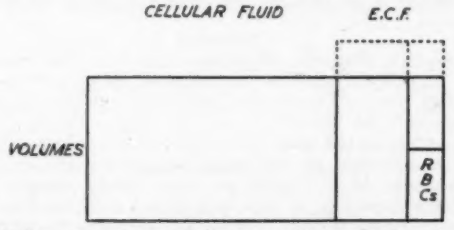

Fig. 12—Expansion of extracellular space with increase in volume of plasma.

is in anuric patients given excessive quantities of intravenous saline solution or of sodium sulphate. The symptoms and signs are those of congestive cardiac failure. Here it should be pointed out that the heart-failure itself reduces renal function further and lessens the ability of the kidney to correct the imbalance.

The condition is recognised from the history and physical examination, with special reference to observation of the venous pressure. The specific gravity of the plasma is usually low.

Cellular Underhydration

Cellular underhydration occurs when the rate of water intake is less than the rate of loss by all routes. Here cellular and extracellular underhydration usually coexist. In these cases the extent of the underhydration can be roughly assessed by measuring the specific gravity of the plasma. The reason for this is shown in fig. 13. Phillips (1950) has shown that, for each 0·001 rise in the specific gravity of the plasma above the normal 1·027, the patient lacks about 200 ml. of fluid.

Less commonly, cellular underhydration may occur with either normal hydration or overhydration of the extracellular space. Here the mechanism is a primary retention of Na, and an osmotic movement of water towards the extracellular ions takes place (fig. 14). The usual cause of this type of cellular underhydration is the administration of isotonic Na-containing fluids to dehydrated patients without additional water. Water is lost in the breath and through the skin, and, in certain circumstances, through the kidney also, with the result that the extracellular fluid becomes hypertonic and water moves from the cells.

If the patient is conscious he complains of thirst. Later he becomes stuporose or comatose, and often he develops coarse twitchings rather like those seen in hepatic coma. Particularly in children, the body-temperature may rise, sometimes to as high as 103°F. The tongue is small, and in a severe case the muscles have a curious doughy feel, which may be mistaken for œdema. The finding of a high plasma-Na level confirms the diagnosis.

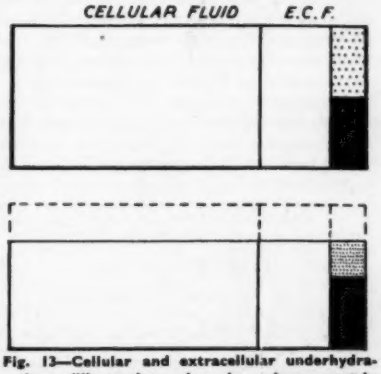

Fig. 13—Cellular and extracellular underhydration (illustrating rise in plasma-protein concentration).

The dots represent protein molecules. Their concentration rises as water is lost from the plasma. The specific gravity of protein-free plasma is about 1·008, and that of normal whole blood 1·027. The difference between these two figures is due to serum-proteins. Therefore the specific gravity of plasma can be used to measure the plasma-protein level.

Extracellular Underhydration

Extracellular underhydration may occur as a part of general underhydration or as an isolated manifestation. In the latter case it is due to a deficiency of extracellular ions.

The clinical picture, with sunken facies, lax skin, diminished eyeball tension, and, later, hypotension and rapid pulse, is well known. The measurement of the specific gravity of the plasma is very valuable in assessing the extent of the water lack.

It is particularly important to recognise extracellular underhydration, because it leads to peripheral circulatory failure with associated circulatory renal insufficiency (extrarenal uræmia). This secondary reduction in renal function may cause many of the other uræmic pictures already dealt with.

Uræmic Manifestations whose Mechanisms are Unknown

Anæmia.—Chronic azotæmia is almost always accompanied by a normocytic normochromic anæmia, and the severity of the anæmia parallels that of the azotæmia.

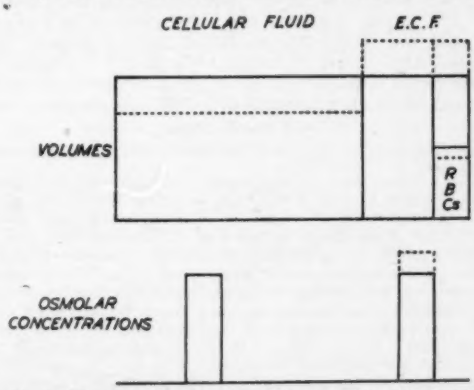

Fig. 14—Cellular underhydration due to hypertonicity of extracellular fluid.

For comment, see text.

The mechanism is unknown, except that the anæmia is usually of the dyshæmopoietic type but occasionally has a hæmolytic element. It does not respond to the usual hæmatinics.

Anæmia is important because it may cause cardiac failure or circulatory renal insufficiency, both of which make the azotæmia worse.

Purpura is common in terminal uræmic states. Again, the mechanism is unknown.

Intestinal disturbances.—Stomatitis, gastritis, enteritis, and colitis may occur in severe renal failure. These may be produced by high concentrations of ammonia formed from urea by the urease normally present in the gastric mucosa and in intestinal organisms.

Pericarditis occurs in terminal renal failure. No completely satisfactory explanation has been given.

Infection is very common in terminal uræmic states and plays an important part in causing death in many patients with renal failure (table I). Such patients appear

TABLE I—CAUSES OF DEATH IN RENAL FAILURE

Disease	Infection	Other causes
Acute renal failure * (mostly acute tubular necrosis)	24 (63%)	14
Chronic renal failure †	13 (34%)	24

* Mostly patients seen with Dr. Jockes and Dr. Lowe.
† From necropsy records of department of pathology, Belfast. Figures kindly supplied by Professor Biggart.

to be particularly liable to infection, especially bronchopneumonia. In some this tendency is obviously explained by a disturbed level of consciousness, but in others there is no obvious cause, and one wonders whether there is some disturbance in the immunity mechanism in the lung. Possibly the curious "uræmic œdema" of the lung described by Doniach (1947) acts as a precipitating factor. The usual infecting organism is the staphylococcus, and at least in the last few years this has been penicillin-resistant in many cases.

Infections are important in two ways: they may prove fatal because of the toxæmia; but also they may increase metabolism and so flood the system with end-products of tissue breakdown, disturbing an already precarious state of water and electrolyte balance. Release of potassium from cells as a result of this katabolism is of special importance in the anurias.

Thus in the management of renal failure the prevention and treatment of infection and its consequences require careful attention.

Conclusions

Combinations of the disturbances described account for most of the clinical pictures met with in renal failure, but I do not wish to leave the impression that they account for all. Some patients may be comatose or even die without our being able to detect, by our present techniques, any causal chemical abnormality. Conversely, other patients may show quite gross deviations from the normal blood chemistry, with no clinical abnormality.

(To be concluded)

"... The theory of the modern kitchen and the labour-saving device is that it suddenly launched women on to new seas of opportunity, oceans of rippling, sun-flecked leisure. And there is no doubt at all that it has absorbed, via the electric motor, a great deal of absurd drudgery which no human being ought to have to do at all. But it now appears that women still have to decide to use wisely the leisure they have gained. And the Senate report seems to say that there is still no electronic escape from the time that should be given to children; and no substitute for the maybe seemingly lazy contact with one's own children. It is not the male tyrant any longer, or the educator, or the intellectual who insists that woman's place is in the home. It is now, heaven help us, the psychiatrist."—ALISTAIR COOKE, *Listener*, March 31, 1955, p. 561.

THE DIFFICULT APPENDIX

PHYSIOLOGY APPLIED TO DIAGNOSIS

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TWENTY-FIVE years ago, as a locum in general practice, I was called to a young girl who complained of intermittent abdominal pain and vomiting. Daily observation failed to elicit any physical signs. After five days another practitioner was called in, but too late. The patient had general peritonitis and died shortly after admission to hospital.

Later, when in general practice on my own account in the country, I saw a young man who had had sudden violent abdominal pain and vomiting. There was no abdominal rigidity nor tenderness, but during the course of the day localised deep tenderness in the right iliac fossa was discovered. There was no pyrexia and the pulse-rate was 60. A colleague who was called in agreed with my belated diagnosis. A backward-lying perforated appendix was removed and the patient recovered.

A few months later, in hospital practice, I saw a boy with no abdominal signs, no pain, no pyrexia, and no rise in pulse-rate. He appeared to be perfectly well and I was inclined to send him back to his doctor, whose letter recorded abdominal pain and tenderness. On the strength of this, however, the boy was admitted. Pain and tenderness soon recurred, and three hours after admission a gangrenous appendix was removed and he recovered.

Diagnosis

The final diagnosis of appendicitis must be based on the correlation of the pathological changes with the clinical picture—a picture built up from the physical signs and the significant details in the history. The notes made at the time of examination must be continued at the operation by recording the position and external appearance of the appendix, surrounding organs, and peritoneal cavity. A specimen of any peritoneal fluid is taken for microscopy, culture, and tests of sensitivity to antibiotics. The appendix is slit from end to end and its walls, mucosa, and contents examined. A watchmaker's eyeglass may reveal a fascinating vascular pattern and differentiate post-inflammatory petechiæ from vascular flares.

The First Attack

The first attack is ushered in by diffuse central or transverse umbilical pain, of gradual onset and steadily increasing severity, and nausea. This pain is visceral, and is referred along the 10th dorsal nerves, the excitable state of which is shown by Ligat's sign—that is, pain on pinching and drawing away the skin and subcutaneous tissue on one side or the other below the umbilicus. Later, abnormal stimulation of the parietal peritoneum may accentuate the spinal reflex on the right side, thus giving the sign as Ligat described it. Pain may be epigastric from pylorospasm, or hypogastric from spasm of the sigmoid colon, with loss of appetite, nausea, and vomiting on the one hand and constipation on the other.

The inflammation may resolve in a few days and the appendix return apparently to normal. It may leave a condition of fibrosis, either diffuse in the walls, or around certain lymph follicles, leading to sunken red petechiæ, which turn purple within a year of the attack, and in the course of years may become white, giving a quilted appearance. The red hæmorrhagic flares caused by the application of forceps to the meso-appendix are not sunken. Recurrent attacks of catarrh presumably cause the condition of diffuse fibrosis of the wall with atrophic mucosa and progressive obliteration of the lumen from the tip backwards, leading eventually to a natural cure. On the other hand, fibrosis may lead to localised narrow-

ing of the lumen with incomplete emptying and stercolith formation with retention.

The first attack may hardly have been noticed by the patient or may have been forgotten. Subsequent attacks may be similar to the first, or may start with pain in the right lower quadrant, or with nausea or mid-abdominal colic, due to appendicular obstruction either from œdema complicating fibrosis of the walls or from impaction of a stercolith. Continuing obstruction of the lumen is followed by distension and gangrene of the mucosa, with spread of the infection through the wall in the case of stricture or local ischæmic necrosis in the case of an impacted stercolith, which may ulcerate through the wall and into the peritoneal cavity. Gangrene or perforation gives relief of the visceral pain and disappearance of Ligat's sign. Peritonitis may then be diffuse, or limited to a local pocket or to a focal abscess by a cap of greater omentum. In the rare case where obstruction is not complicated by infection or gangrene, a mucocele of the appendix is formed.

The Position of the Appendix

The effect of the progress of inflammation from the mucosa through the wall to the serous surface depends on the site of the appendix and its relation to surrounding viscera and parietal peritoneum. Irritation is caused by direct contact with the inflamed appendix and by centrifugal spread of irritation in the peritoneal cavity. The vehicle of this irritation, which may be likened to an odour, is presumably peritoneal fluid exuded from the serosa of the appendix.

Should the appendix be lying untethered in what is considered to be the normal position, with maximum tenderness deep to McBurney's point, this irritation has access to the parietal peritoneum, pain is referred by spinal reflex to the right lower quadrant, and it is aggravated by spinal or respiratory movements or by any considerable or sudden movement of the abdominal wall with consequent voluntary limitation of these movements and involuntary protective increase in muscle tone of the parietes by spinal reflex. Sudden release of pressure gives rebound tenderness; and referred tenderness, particularly on rebound, can be demonstrated by pressure elsewhere. Some degree of local ileus is shown by a silent abdomen, constipation, and fœtor of the breath. Parietal irritation is also accompanied by rise in temperature and pulse-rate.

The inflamed *paracæcal appendix* gives tenderness on pressure in the outer part of the right loin, and anteriorly $1^1/_2$ in. above and external to McBurney's point.

The rarer *inverted cæcum* gives tenderness over the gall-bladder, to which the appendix is then adjacent, and the diagnosis is made easier by re-examination after hyperextension of the lumbar spine by means of a pillow in the small of the back to separate these organs.

The *retrocæcal appendix* can be considered to be extraperitoneal. There is irritation of the cæcum and adjacent muscles, with excess of flatus or early transient true diarrhœa, and tenderness in the loin below the right kidney. Bimanual examination between the loin and flank may suggest renal tenderness, but tenderness is also continued caudally and is not localised to the kidney. Direct irritation of the ureter may produce some increase in frequency of micturition, which is not, however, so marked as in urinary infection. It must be realised that urinary infection and appendicitis may co-exist, and that removal of the appendix may clear the urinary infection. Protective flexion at the right hip-joint is produced by psoas irritation, there is pain on walking, and passive extension of the right hip gives pain in the right lower quadrant or groin (psoas-stretching test).

The inflamed *pelvic appendix* may irritate the bladder, giving rise to hypogastric pain relieved by micturition, the rectum, with a discharge of mucus (a spurious diarrhœa), or the lumbosacral cord, giving pain referred down the lower limb. These symptoms are relieved by appendicectomy. The sign of an inflamed pelvic appendix, however, is high right posterolateral tenderness and fullness at the finger-tip on rectal examination, with pain referred to the abdomen. This may be confirmed by pain on passive internal rotation of the right hip in flexion (obturator-internus-stretching test). Tenderness may also be elicited by deep localised pressure $1^1/_2$ in. below and internal to McBurney's point; this, however, may be absent, and I have not commonly elicited the obturator test.

The difficult case for diagnosis is the inflamed *tethered retro-mesenteric appendix*, which gives none of these parietal signs. The only organ directly irritated is the lower ileum with its mesentery. The appendix is connected by its meso-appendix with the left leaf of the mesentery of the ileum. Should this meso-appendix be long, the appendix is mobile and is free to irritate the parietal peritoneum by direct contact or centrifugal spread, with local pain and the generally recognised signs of the mobile inflamed appendix.

There is an anatomical variation, however, in which the meso-appendix is short near the tip, allowing little or no movement between the appendix and the deep surface of the mesentery of the ileum, in which in fact it may be embedded. This can effectively enclose the inflamed appendix, without help from the greater omentum, beneath the mesentery of the ileum, deep in the coils of small gut, local dilatation of which protects the appendix from the tenderness of ordinary pressure and the parietal peritoneum from irritation. Infection is free to spread deep in the left iliac fossa and down to the pelvis still enclosed in mesentery and gut.

Pain is not localised to the right lower quadrant. There is no muscular rigidity nor increase in muscular tone, no tenderness on light pressure nor guarding, no rise in temperature nor marked rise in pulse-rate. The bowel is not silent, and through absence of constipation there is no fœtor of the breath and the tongue is clean. The patient does not look ill, has periods without pain, and may go to sleep.

Tenderness, if present in these cases, can only be elicited by localised deep pressure with one finger, $1^1/_2$ in. above and internal to McBurney's point—that is, midway between McBurney's point and the umbilicus—and from this point in a vertical line upwards 2 in. long with its centre 1 in. to the right of the umbilicus. This deep pressure may produce guarding, and tenderness may be more marked on rebound.

The inflamed posteriorly fixed appendix is distinguished by the absence of those parietal signs which are found in a mobile organ, and the usual quiet abdomen with constipation is replaced by symptoms of local activity of the bowel; the retrocæcal appendix by excess of flatus or true diarrhœa at the onset; the pelvic appendix by spurious diarrhœa; and the tethered retromesenteric appendix by symptoms to be described below.

Bowel Symptoms

The tendency to stasis from localised paralytic ileus is countered by direct irritation of the lower ileum. This is revealed by the auscultation of intermittent bursts of squirting borborygmi, which may sometimes be continuous; but there is no diarrhœa. The patient may say he has diarrhœa, but careful questioning will elicit the fact that the motions are frequent and soft but not fluid. Not having been subjected to the action of a laxative, the bowels are spontaneously opened three or four times in a day with small formed motions, followed by perhaps one or more soft motions which may be green. The ileum propels its contents with increased frequency into the cæcum, whence progress along the colon is more leisurely, enabling some fluid absorption to take place, though progress is somewhat faster than normal. These frequent bowel actions are also described in previous

attacks and may last for only one day, local ileus then predominating.

Rupture, should it occur, is into the retro-mesenteric pocket and there is no generalised "burst spread." Pain and hyperæsthesia disappear, and dilated gut cushions the part from tenderness and the parietal peritoneum from irritation. There is a latent interval with no physical signs, comparable with that of gangrenous intussusception and of gall-stone ileus. The bowel is in a state of ileus due to sub-ileal peritonitis. No flatus or fæces is passed, and auscultation reveals a silent abdomen. Later, deep localised bilateral tenderness is found, and within one to three days nausea recurs with some pain, and bowel actions are resumed. These take the form of diarrhœa, from external irritation of the distal large bowel (see cases 1, 2, 4, and 5 below). Nausea ceases and the tongue is clean. Distension is a feature when ileus is accentuated by the taking of a purge (case 4), when bowel action is delayed (case 3), or where peritonitis is prolonged (case 1).

Illustrative Cases

All these patients were seen by consultants, who found some difficulty in diagnosis. Each case seems to show the symptoms and signs which can be expected in the various stages of an acutely inflamed tethered retro-mesenteric appendix. The most serious and complicated cases come first, and the later ones show progressively less serious complications and earlier diagnosis. I have indicated in parenthesis what I consider to be the time of perforation of the appendix.

Case 1: General Peritonitis, Mesenteric Phlebitis, Portal Pyæmia

A man of 38 was well until a fortnight before admission, when he had abdominal pain which lasted for a few days (*appendix perforated when pain ceased*). A week after the onset he had diarrhœa and vomiting, thought to be due to gastric influenza. Three days later, on a Saturday, he felt ill with abdominal pain and vomiting, some distension and constipation. Bowels were moved with aperients. On the Sunday and Monday the vomiting continued every six hours or so; it was not fæculent, and he passed a little flatus. He was admitted to hospital on the Wednesday with a temperature of 97°F, pulse-rate 84, and respirations 20. A plain radiograph of the abdomen showed multiple fluid levels.

Operation revealed a gangrenous appendix which had caused general peritonitis. The abdomen was mopped out as much as possible and closed with drainage tubes in position. There was no postoperative vomiting, but the abdomen became distended. Two days after the operation, an intravenous drip was set up and gastric aspiration instituted. His temperature rose above normal for the first time since admission. He seemed to do fairly well for a time and was able to drink. He passed a small amount of flatus and fæces. But a fæcal fistula formed at the lower end of the wound, and he became jaundiced. Ten days after admission he was very jaundiced and stuporose, and he collapsed and died that evening.

This patient apparently harboured diffuse sub-ileal peritonitis for ten days under careful observation, with no morning or evening pyrexia for a fortnight. Tenderness was absent or slight and transitory, and no rigidity was found. Intestinal obstruction threatened after a week. The temperature first registered above normal the day following operation. The cause of death was mesenteric thrombosis, fæcal fistula, and portal pyæmia.

A colleague has told me of a similar case kept under careful observation in hospital before operation, with similar operative findings, the appendix lying backwards and adjacent to the mesentery of the ileum. The patient became jaundiced and died.

Case 2: Diffuse Peritonitis, Recurrent Abscesses, Fæcal Fistula

Two years before I first saw her, a girl of 23 had had her first attack of abdominal pain, lasting thirty-six or forty-eight hours; she felt sick and retched, and there was pain and tenderness around the umbilicus. A year later she had a similar attack, and then no further trouble. She had a three-stage thoracoplasty nearly twelve months before I saw her. Two days earlier she ate some cooked cheese, which always upset her. Next day she felt sick with recurrent periumbilical soreness which came and went, like an occasional kick in the stomach. She felt better in the evening (*appendix perforated*) and on the following morning, but she still had occasional pain. In the evening her temperature was 100·4°F (6 P.M.) and 101°F (6.30 P.M.). She had slight pain and very occasional nausea. She had taken only a little fluid. The bowels had not opened and no flatus had been passed: but she had had an enema that afternoon with flatus result and felt better, though she vomited once copiously. In this attack, there was excess of flatulence with eructation and relief. There were no urinary symptoms and no rigors. She had just finished a period. Previous attacks were not remembered to have had any relation to periods.

At 8 P.M. the abdomen was slightly distended. Ligat's sign was absent. There was good but even tone of the abdominal muscles. No superficial nor deep tenderness could be elicited, and there was no rebound sign. The abdomen was silent. The rectum was almost empty, but a little ballooned, with some tenderness referred to the hypogastrium. Conclusion: "I must diagnose an inflamed backward-lying appendix here."

A white-cell count showed 21,000 cells per c.mm. At 9.10 P.M., obturator-internus and psoas stretching tests were both found to be negative. She felt quite comfortable and had slept.

Next morning I learned she had vomited bile and had passed two loose stools with relief. There was very slight deep tenderness on either side below the umbilicus. The abdomen was still quiet. The white-cell count was 30,000 (80% polymorphs), the temperature 99·2°F, and pulse 112. She was admitted to hospital and operated on in the afternoon. An acutely inflamed appendix, gangrenous and perforated at the base, was removed. There was a fæcolith lying free in the peritoneal cavity, and much foul fluid. The appendix was lying backward behind the ileo-cæcal junction. There was no stump of appendix because of the perforation. The hole in the cæcum was oversewn as well as possible, and the abdomen drained by one tube.

She had a difficult time and did not leave hospital until six months later. A pelvic abscess developed, which burst and passed per rectum a month after the operation. Three weeks later she had a laparotomy with aspiration and drainage of a localised extraperitoneal abscess running from the left iliac fossa down to the left side of the pelvis and to the right of the midline. Four days after this operation fæcal material and flatus discharged from the wound in the left iliac fossa. Five weeks later the abscess was drained extraperitoneally by inserting sinus forceps through the wound. At a second drainage six days later a drainage tube was inserted well down into the cavity. 'Lipiodol' injected into the tube showed a narrow track the width of the tube extending about 7 in. towards the head of the left femur, but no definite cavity. A month later pain recurred in the left iliac region, and the pelvic abscess had re-formed, but this drained satisfactorily, and the wound became dry. She was left with residual induration in the left iliac fossa. Subsequent progress was satisfactory.

At various times during her illness, pus from the abscess grew coliform bacilli, *Staphylococcus aureus*, and proteus. At no time were tubercle bacilli or actinomyces found. The organisms found were sensitive to streptomycin and chloramphenicol. She was given two courses of intravenous aureomycin in the first two months of the illness.

When I first saw this patient, she was in the latent interval of lower-pole retro-ileal peritonitis after perforation of her obstructed appendix. Apart from raised temperature and pulse-rate, the only sign was rectal tenderness referred to the hypogastrium; the white-cell count was raised, however, and the next morning there was very slight deep bilateral abdominal tenderness.

Case 3: Localised Sub-ileal and Pelvic Abscess

A woman aged 73 had severe pains low on both sides of the abdomen with swelling of the abdomen and bad headache. For about nine months previously she had had high epigastric pain radiating down the front of the abdomen, not apparently related to meals, but eased by a light breakfast; it was always there, a constant burning pain. She had always been constipated, more severely in recent months. She passed small motions followed by a little blood after straining. Pain woke her at night.

I first saw her five days after the attack of severe pain. She had passed no flatus since. (*Appendix had perforated and ileus followed.*) She had vomited a little green bile every day. Borborygmi were relieved by eructation. There had been pain in the vagina for the past two days. Her bowels had not been open since the attack of pain until the day I saw her, when they were opened three times with temporary relief, the first time soft, the second formed, the third a good movement. Her temperature was 99·6°F, and pulse-rate 84. She was emaciated, with pale eyes. The tongue was clean and dry with a few plaques. The abdomen was resonant, distended, and tender all over, with positive rebound sign. There was no true rigidity or palpable tumefaction, but I found visible coils of gut with quiet squirting borborygmi in the left lower quadrant. No peristalsis was seen. The rectum was ballooned and tender. She was admitted to hospital with a diagnosis of threatened acute intestinal obstruction, probably from carcinoma of the lower colon. X-ray examination of the abdomen showed some distended coils of small bowel. An enema produced flatus and later a small action.

At operation two days after admission, pus was found among the coils of small gut, with organised exudate and an abscess deep in the pouch of Douglas. A perforated appendix was adherent to the ileum and it was removed, but the stump could not be invaginated. Adhesions were separated from the lower end of the ileum. Postoperative treatment included half-hourly aspiration from an indwelling Ryle's tube, intravenous fluid, and streptomycin. Two days later flatus was passed and loud squirting borborygmi were heard. Ten days after the operation the abdomen was much distended. The bowel was silent and there was very slow slight visible peristalsis. The temperature swung to 102°F. Pus discharged spontaneously from the lower end of the wound and the temperature quickly settled. The patient was discharged fit five weeks after the operation.

In this case the peritonitis had not spread, but localised to form an abscess among the coils of small gut, and the bowel actions were similar to those to be expected, before perforation, from irritation of the lower ileum—that is, one soft motion and two formed ones (but see case 5).

Case 4 : Localised Abscess, Commencing Lower-pole Peritonitis

A man aged 67 was admitted to hospital with a diagnosis of subacute intestinal obstruction. His doctor wrote : " Three days ago this patient had some ' indigestion ' and went off his food. Prior to this he had been in great fettle. Next day he gave himself a large purge and during the afternoon was smitten with violent abdominal pain. He tried to get to the lavatory but collapsed en route. I found him writhing with colic. His abdomen was much distended and tight as a drum. Knowing that he has a double rupture I went for his inguinal rings. I thought that I felt a tense swelling high up in the left inguinal canal. Before I could be sure he rolled over suddenly and started violent retching, bringing up a little altered blood. When I again examined him there was no swelling in the canal (if there ever had been), and his pain became rapidly better and gr. $^1/_{100}$ of atropine completed the job. (*Appendix perforated.*) I saw him yesterday, and he was much better. Today he is not so well. He is afebrile with a pulse of 80 and his tongue is dry. His lower abdomen is distended. His rectum is empty and feels normal. He is nauseated but has not been sick. He has absolutely no appetite but very little abdominal pain. He has passed several small watery stools but no flatus."

In hospital his temperature was 99°F and pulse-rate 84. His eyes were dull, and tongue furred, brown, and dry. The abdomen was distended and resonant. There was no true rigidity, but it had a doughy feel. Ligat's sign was negative. There was slight temporary increased muscle tone in the right lower quadrant. Tinkling sounds were auscultated. There was a definite positive rebound sign in the right and left lower quadrants, but no referred tenderness. There was slight localised deep tenderness (*a*) 2 in. above the pubic tubercle on the left, and (*b*) $1^1/_2$ in. internal to McBurney's point on the right, 1 in. from the midline and 1 in. below the umbilicus. Rectal examination revealed no abnormality. A diagnosis of retro-ileal appendicitis with lower-pole peritonitis was made.

On opening the abdomen, red coils of gut were seen, but there was no free fluid. A backward-lying appendix, swollen, gangrenous, and perforated at the tip, was lying in a small abscess cavity with an ounce of thick pus among the coils of small gut. A collection of reddish-brown fluid was found in the left iliac fossa, with a similar collection deep in the pelvis. The appendix was removed, and the fluid mopped out. The upper abdomen was explored with a swab, and nothing was found. The abscess cavity in the right iliac fossa and the pelvis were both drained. Pus from the retro-ileal abscess gave a growth of lactose-fermenting coliforms. He was given streptomycin (1 g. twice daily intramuscularly) with intravenous saline and hourly aspiration of the stomach. Next day he was very thirsty and there were no bowel sounds. A week later he looked and felt much better, and was on a full diet. His bowels were working, his fluid state was good, and the abdomen soft. Subsequent progress was satisfactory.

In this case (and in cases 1 and 2) the diarrhœa was watery and quite transient, and, by analogy with case 3, presumably due to direct external irritation of the distal colon and rectum from the spreading peritonitis. This might have remained localised but for the purge, which presumably caused early spread of inflammation to the left iliac fossa and to the pelvis, with slight temporary increase in parietal muscle tone, localised bilateral deep tenderness, both direct and on rebound, and distension. The temperature rose only slightly above normal, just before operation, presumably from pus under pressure with pulse-rate 84. There was no rigidity. After operation, some degree of paralytic ileus persisted for a week. Case 3, with an abscess deep in the coils of small gut, showed similar signs and postoperative course.

Case 5 : Localised Abscess, Small-gut Obstruction

A fortnight before I saw her a woman of over 70 had had vomiting and diarrhœa. She took to her bed and the vomiting ceased (*appendix perforated*) ; and later the diarrhœa stopped too. The day before I saw her she took food, but later the vomiting recurred with acute abdominal colic. Her bowels were open once. One of her dogs at the time had symptoms of gastro-enteritis.

We found her temperature 96°F and pulse-rate 75. The tongue was clean, moist, and red. She was having recurrent attacks of supra-umbilical pain. There was a firm or hard tender intra-abdominal swelling deep to McBurney's point. It was not freely mobile. Some borborygmi were heard. Rectal examination revealed a fixed cervix and a considerable amount of soft fæces, The vomit was brown and offensive.

The patient said that forty years ago she had had a similar pain with " gastritis and dysentery," recurring one year ago for two or three days. She felt that if she could get her bowels open she would be better. She was admitted to hospital and an enema gave a fair result of formed fæces with flatus. The vomiting continued. We found shifting dullness in the flanks. A diagnosis of acute lower small-gut obstruction was made.

At operation we drained a fibrotic appendix abscess causing small-gut obstruction by adhesions. These were divided, leaving some narrowing of the lower ileum. The appendix was removed, and a side-to-side anastomosis of the lower ileum was constructed. A tear in the cæcum was repaired. Postoperative progress was satisfactory.

Pus from the appendix abscess showed numerous gram-negative bacilli and a fair number of gram-positive cocci. Culture grew lactose-fermenting coliform bacilli and staphylococci, overgrown by proteus.

This case, though with a similar localised abscess to case 3, showed persistent diarrhœa for a fortnight. This may have been due to enteritis secondary to the small-gut obstruction which became acute, or the patient may have suffered from the same infection as her dog.

Case 6 : Gangrenous Appendix

A middle-aged woman was seen in consultation. Three years ago she had had infective hepatitis with severe jaundice for some weeks, and she had had irregular indigestion since then. At 2 P.M. on the previous day a steady constant stomach ache began, but she did not vomit. She passed three motions up to 9 P.M., which were not loose. Her temperature and pulse were normal. The tongue was dirty. She was seen by a colleague, who found generalised abdominal tenderness a little more on the right than on the left. There was no guarding nor rebound tenderness, but she did not like deep pressure. Vaginal examination revealed no abnormality and no referred pain. The small-gut was thought to be the seat of the trouble. The pain continued all night, and the next morning the temperature was 99°F, and pulse 96. She vomited a small

amount at 10 A.M., and passed a motion which was green and black. She was now a little more tender all over. There was no distension but a little indefinite guarding. She had had nothing to eat since the onset of the pain, and a morning cup of tea was recently vomited.

When I saw her the tongue was furred, greenish, and moist. The abdomen moved with respiration, with a catch of severe pain on coughing. There was no rigidity or tumefaction. She had generalised abdominal tenderness with much rebound tenderness in the right iliac fossa, but no particular pressure tenderness, except in the right iliac fossa, maximum at McBurney's point and towards the umbilicus. The abdomen was silent. Ligat's sign was not elicited, and the obturator-internus test negative. Passive hyperextension of the right hip referred pain to the abdomen.

Operation revealed an acutely inflamed, green, distended retro-mesenteric appendix with white external exudate. This was removed and the abdomen closed without drainage. Convalescence was uneventful.

The appendix lumen contained liquid fæces. The mucosa was thin and red with small black patches. A fæcal concretion was wedged in the proximal end.

Case 7 : Acutely Inflamed Appendix

A child of 7 was admitted after three days' intermittent abdominal pain. On the day it began her bowels were moved three times. At 4 P.M. on the day of admission she vomited. Her temperature was then subnormal and pulse-rate 88. No tenderness was found in the abdomen or rectum, but scybala were felt. Pain and vomiting continued ; the pain was mostly around the umbilicus. The pulse-rate rose to 120. The only abnormal sign which had been elicited was a rising pulse-rate, and on this she was sent to hospital.

On admission at 10.40 P.M. her temperature was 100°F, and pulse 140. There was guarding on the right side, but she was not particularly tender. I saw her at 11.25 P.M., when there was good tone of the abdominal muscles, slightly increased in the right lower quadrant, but no tenderness. A mobile tumour as big as a hazel nut and like a gland was felt in the right iliac fossa. Continuous borborygmi were auscultated. Rectal examination revealed tenderness mainly on the right, with pain referred to the umbilicus. There was no spontaneous pain.

I was uneasily inclined to observe the case as one of gastro-enteritis, but perusal of the case-sheet and confident prompting of a wise house-surgeon led to immediate operation. Through a midline incision a low lying retro-ileal appendix with omentum adherent to the bulbous tip was removed. There was no free fluid. The bulbous tip was found to contain pus, and the mucosa was black. Proximal fibrosis closed the cavity. Progress was satisfactory.

Conclusions

The inflamed tethered retro-mesenteric appendix is deep in the centre of the abdomen, and the symptoms and signs to which it gives rise are entirely visceral from inflammation of the appendix itself and from irritation of the adjacent lower ileum, producing frequent formed motions. Tenderness is to be elicited only by localised deep pressure at the sub-ileal point, which in the adult is $1^1/_2$ in. from the umbilicus to the right and below, and by pressure in a vertical line extending upwards from this point to 1 in. above the level of the umbilicus.

Perforation is accompanied by cessation of symptoms and disappearance of subcuticular hyperæsthesia, and peritonitis spreads deep in the left iliac fossa and down to the pelvis, irritating the distal large bowel and giving rise to watery diarrhœa. There may then be bilateral deep suprapubic and rectal tenderness.

There is no irritation of the parietal peritoneum or greater omentum (and consequently no rise in temperature nor increase in pulse-rate of more than 20 beats per minute), no increase in parietal muscular tone, no rigidity, no constipation, and no fœtor of the breath, and the tongue is clean.

In the case of the mobile untethered inflamed appendix, nervous reflex from irritation of the parietal peritoneum is the cause of (1) pain in the right lower quadrant ; (2) decreased mobility of the abdominal wall ; (3) the predominance of Ligat's sign on the right side ; (4) local increase of muscular tone and rigidity ; (5) tenderness on light pressure ; (6) referred tenderness ; (7) continuation of general intestinal stasis with quiet abdomen and fœtor of the breath ; (8) pyrexia ; (9) a rise in pulse-rate of more than 20 beats per minute ; (10) continuing malaise ; and (11) sleeplessness.

None of these signs is present in the tethered retro-mesenteric appendix, even after rupture with peritonitis. Pus contained under pressure, however, may cause pyrexia. The absence of tenderness to ordinary palpation is explained by localised distension of the lower ileum, which can be shown by plain X-ray examination, and by the inaccessibility to pelvic examination when the appendix is both high and unruptured. The peritonitis can spread quietly among the coils of small-gut and down to the pelvis because the containing power of the greater omentum is elsewhere.

Inflammation in the mobile appendix and in the tethered retro-mesenteric appendix must be regarded as two different diseases affecting different parts of the abdominal cavity which are separated by the mesentery of the ileum. The one has access to the parietal peritoneum and the general peritoneal cavity ; the other is shut in behind the mesentery and may spread to the left and down to the pelvis ; but it may give rise to one upper abdominal complication—mesenteric phlebitis and portal pyæmia. The symptoms of retro-mesenteric appendicitis are entirely visceral.

Summary

The symptoms and signs of the various stages of acute inflammation of the tethered retro-mesenteric appendix are analysed and correlated with the pathological changes.

The clinical picture is entirely different from that of the inflamed untethered mobile appendix, apart from the onset of the first attack in the latter before the parietal peritoneum has been irritated. The physiological cause of this difference is indicated.

The symptoms and signs of the tethered retro-mesenteric inflamed appendix give a changing picture which suggests in turn both gastro-enteritis and intestinal obstruction but is typical of neither. Their very peculiarity and alternations, however, paint a clinical picture of intestinal paralysis interrupted by bursts of over-activity which do not appear to be adequately reflected in the bowel actions. This is typical of the condition in its various stages.

I have regarded McBurney's point as $^1/_2$ in. below the midpoint of the line joining the umbilicus to the right anterior superior iliac spine.

I wish to thank my colleagues of the Hastings group for their coöperation. The surgeons have been extremely helpful, and my particular interest in the condition was first aroused by Dr. A. F. W. Hall. *The Early Diagnosis of the Acute Abdomen* by Sir Zachary Cope has been worth its weight in gold.

IRON-DEFICIENCY ANÆMIA IN PREGNANCY

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OUR investigation of the anæmias of pregnancy, undertaken at the Rotunda Hospital, Dublin, with Dr. H. C. Moore, has already been published (Lillie et al. 1954, Moore et al. 1955). Here we deal with the cases of iron deficiency studied at that time.

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Methods

Blood was taken, for hæmoglobin and hæmatocrit estimation, from every woman on her first attendance at the antenatal clinic. At first all women with hæmoglobin below 10 g. per 100 ml. were referred to a special anæmia clinic, but the numbers were such that this arrangement had to be revised, and for most of the year only women with hæmoglobin below 9 g. were directed to the special clinic.

At this clinic the history and examination were noted on a special form. Spontaneous symptoms were recorded, and each patient was questioned about personal symptoms, diet, and past history. Every patient was examined in a similar fashion. A particular note was taken of her general appearance, the state of the finger-nails, and the colour of the tongue and conjunctivæ. The heart, lungs, and reflexes were examined in all cases. The clinical signs were recorded always by the same observer (P. B. B. G.) to avoid error.

Iron by mouth was prescribed and each patient was seen regularly to make sure that she was taking the drug as ordered. Her blood was examined every four weeks, and she was followed through pregnancy to term. Women who did not respond to oral iron were treated with intravenous iron; and, if this did not increase their hæmoglobin, their sternal marrow was examined.

TABLE I—MONTHLY INCIDENCE OF ANÆMIA IN PREGNANCY

Month	No. of pregnancies	No. with Hb less than 10 g. per 100 ml.	No. with Hb less than 9 g. per 100 ml.
January ..	389	129 (33%)	54 (14%)
February ..	428	124 (29%)	54 (13%)
March	388	95 (24%)	40 (10%)
April	313	74 (24%)	36 (12%)
May	370	97 (26%)	39 (11%)
June	356	107 (30%)	32 (9%)
July	348	79 (23%)	25 (7%)
August	379	60 (16%)	20 (5%)
September ..	383	56 (15%)	14 (4%)
October ..	383	96 (25%)	33 (9%)
November ..	340	55 (16%)	19 (6%)
December ..	237	55 (23%)	23 (10%)
Total	4314	1027 (24%)	389 (9%)

Prevalence and Grades of Anæmia

Of 4314 patients 1027 had a hæmoglobin value of less than 10 g. per 100 ml. If the standard of 10 g. be accepted as the lowest value which can be regarded as due to hydræmia (Dieckmann and Wegner 1934), there were 1027 cases of anæmia among the first attendances at the antenatal clinic in the year (23·8% of the pregnant women attending the hospital). Many who had a normal hæmoglobin value on their first attendance became anæmic later in their pregnancy. Hence the total incidence of anæmia in pregnancy must be greater than 23·8%.

TABLE II—INCIDENCE OF DIFFERENT GRADES OF ANÆMIA

Hb (g. per 100 ml.)	No. of cases
5·0–5·9	9 (2·25%)
6·0–6·9	22 (5·5%)
7·0–7·9	87 (22·0%)
8·0–8·9	219 (55·0%)
9·0–9·9	60 (15·0%)
Total	397

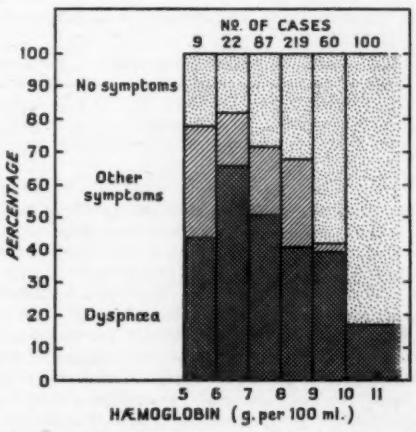

Fig. 1—Relation of symptoms to amount of hæmoglobin.

Doyle and McGrath (1954), in a similar survey from the Coombe Hospital, Dublin, found an incidence of 31·4% with Hb below 10 g.

Dieckmann (1945) found 12% of women at the Chicago Lying-in Hospital to have Hb below 10 g.

The figure given by Scott and Govan (1949) for Glasgow was 17·6%, which they regarded as much higher than those found elsewhere in Britain.

Benstead and Theobald (1952) reported from Bradford that 6·5% of a consecutive series of 2000 women had Hb less than 10 g.

Lund (1951) found 20% of 4015 pregnant women attending Charity Hospital, New Orleans, to have Hb below that level.

TABLE III—INCIDENCE OF SYMPTOMS OF ANÆMIA

No. of cases	397
No. with symptoms	261 (66%)
No. without symptoms	136 (34%)
Incidence of symptoms:	
Breathlessness	182 (45%)
Tiredness	88 (22%)
Loss of appetite	42 (10%)
Epistaxis	25 (6%)
Headache	17 (4%)
Vomiting	15 (4%)
Sore tongue	6 (1·5%)
Œdema	5 (1%)

The incidence of anæmia seen at the Rotunda Hospital varied according to the season, being lower in the late summer and the autumn (table I). This tendency was also noted by Doyle and McGrath (1954). Similarly Scott and Govan (1949) found that the average monthly hæmoglobin readings in 1946 and 1947 rose in the summer and fell in the winter.

From among the 4314 patients investigated, 397 cases of anæmia were studied in detail in the special clinic. Table II shows the grades of anæmia found in them. The number of cases noted here with hæmoglobin between 9·0 and 9·9 g. per 100 ml. is not related to the true prevalence of this grade; for many cases in this group were not referred to the special anæmia clinic. However, it can be seen that in most of these 397 cases the hæmoglobin lay between 7 g. and 9 g. As will be shown later, even anæmia of this degree can often be missed clinically.

Symptoms

A third of the anæmia patients studied had no symptoms indicating anæmia. The order of frequency of

TABLE IV—RELATION OF SYMPTOMS TO HÆMOGLOBIN LEVEL

Hb (g. per 100 ml.)	No. of cases	No symptoms	Dyspnœa	Tiredness	Anorexia	Epistaxis	Headache
9·0–9·9	60	35 (58%)	24 (40%)	11 (18%)	7 (13%)	6 (10%)	2 (3%)
8·0–8·9	219	70 (32%)	90 (41%)	54 (25%)	17 (9%)	8 (3%)	10 (4%)
7·0–7·9	87	25 (28%)	49 (51%)	15 (17%)	12 (13%)	6 (7%)	5 (6%)
6·0–6·9	22	4 (18%)	15 (68%)	6 (27%)	5 (20%)	2 (10%)	0
5·0–5·9	9	2 (22%)	4 (44%)	2 (22%)	1 (10%)	1 (10%)	0

TABLE V—CLINICAL SIGNS OF ANÆMIA IN RELATION TO HB

Hb (g. per 100 ml.)	No. of cases	No signs	With signs
5·0–5·9	9	0	9
6·0–6·9	21	6	15
7·0–9·5	355	169	186
Total	385	175	210

symptoms, when they were present, is shown in table III. Only breathlessness seemed to have any relation to the level of the hæmoglobin, being complained of more frequently as the anæmia was more severe (fig. 1 and table IV). The other symptoms were not significantly increased as the level of the hæmoglobin fell.

As it is generally held that many normal pregnant women complain of breathlessness, the diagnostic significance of dyspnœa is greatly reduced. However, of a consecutive series of 100 " normal " pregnant women, at or before six months' pregnancy, with a hæmoglobin level above 10 g. there was breathlessness in only 17%, compared with 45% in the anæmic group (fig. 1 and table III). As almost all the anæmic women were interviewed before six months' gestation, their dyspnœa is unlikely to have had a mechanical origin.

Clinical Signs

As is well known, it is quite unsafe to diagnose anæmia on clinical evidence alone. This is amply proved in this investigation. Nearly half the cases (385) with hæmoglobin below 9·5 g. had no clinical signs of anæmia. Of 385 cases 210 (54·5%) had clinical evidence of anæmia—i.e., obvious pallor of the skin or conjunctivæ, or both. The relation of these appearances to the level of hæmoglobin is seen in table V, which shows that, when hæmoglobin is between 7·0 g. and 9·5 g., half the cases show signs of anæmia; and that when it is between 6·0 g. and 6·9 g. three-quarters of the cases do so. It is only when the hæmoglobin is below 5·9 g. that all the patients are clinically anæmic. In other words, it is quite impossible to be sure of excluding anæmia clinically

TABLE VI—PREDISPOSING FACTORS IN HISTORY

Total 400 cases

Blood-loss :	
Menorrhagia	97 (24%)
Bleeding piles	35 (9%)
Epistaxis	25 (6%)
Previous anæmia in pregnancy	100 (25%)
Pulmonary tuberculosis	11 (2·5%)
Diet :	
Never ate meat	26 (6·5%)
Seldom ate meat	177 (44·2%)
Never ate vegetables	11 (2·5%)
Seldom ate vegetables	48 (12%)

when the hæmoglobin is between 6·0 g. and 9·5 g., and the great bulk of anæmia in pregnancy lies in this group.

Berry and Cowin (1950) found in school-children that the colour of the gums was unreliable as an index of hæmoglobin level.

Silverman (1954) observes the colour of the palmar creases in judging the severity of the pallor. He notes that when the red colour of the creases is lost, the hæmoglobin may be judged as being below 7·0 g. However, this is a severe degree of anæmia, and such a sign cannot be depended on in diagnosing milder grades of anæmia.

Hæmoglobinometry is essential in diagnosis as well as in assessing progress. It should certainly be routine at the first antenatal visit and again a few weeks before term. Abnormal changes were found in the nails of 43 women (11·2%): 14 of these had koilonychia, 12 flat nails, and 17 friable or breaking nails. These nail changes were seen mainly in chronic cases. At least a third gave a history of having been treated for anæmia previously. The average parity in this group was 5·7, against the average 3·8 for the total attendance at the Rotunda Hospital in 1953. The hæmoglobin was often very low and averaged 7 g. in the 43 cases.

Ætiology

The history of each patient included questions about possible factors in the production of anæmia. Table VI shows the results, and from these findings it can be concluded that blood-loss and intercurrent disease are not primary causes, occurring in not more than a third of the cases (antepartum hæmorrhage was excluded from the series).

The average parity of the total attendance at the Rotunda Hospital during 1953 was 3·8. In 384 severe anæmias the average parity was 4·8. This indicates that parity may be a factor; and in fact the incidence of severe anæmia was found to increase with parity, though not so much as one might expect (fig. 2). Doyle and

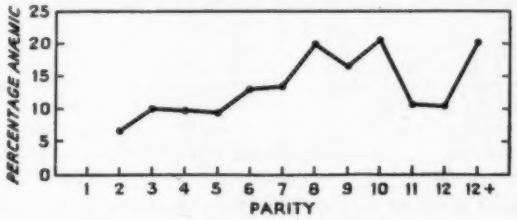

Fig. 2—Relation of parity to anæmia.

McGrath (1954), dealing with the same population, in which there is often a high parity, came to the same conclusion; but other workers, notably Bethell et al. (1939), Scott and Govan (1949), and Lund (1951), have not found this relation.

The only remaining possible factor is inadequate supply of elements essential for formation of hæmoglobin. As absorption and utilisation are rarely at fault, a defective diet is almost certainly responsible. From our brief questioning of these patients, the most striking finding was the lack of meat in their diet. Half of them either never or very seldom ate meat. Most of them ate vegetables besides potatoes: indeed only 14% said they seldom or never ate vegetables. Protein deficiency may be a factor, but there is no doubt that almost all these cases respond very well to iron. As the main sources of iron are green leafy vegetables, which become scarce in late winter and in spring in Dublin, one would expect iron deficiency to increase at this time. This is borne out by our figures (see above), and our finding agrees with those of Scott and Govan in Glasgow and Doyle and McGrath (1954) in Dublin. This seasonal variation may also be due to the diet containing less vitamin C at this time: Lund and Kimble (1943) have ascribed a similar seasonal incidence to lack of vitamin C. The patients were not specifically questioned about other important iron-containing foods, such as oatmeal and liver.

Iron Therapy

At the beginning of the investigation all the women with anæmia were given a supply of gr.·3 ferrous-sulphate

TABLE VII—TOLERANCE TO DIFFERENT IRON COMPOUNDS

—	Ferrous sulphate	Molybdenised ferrous sulphate	Ferrous gluconate
Able to tolerate	92 (46%)	50 (55%)	93 (84%)
Unable to tolerate	97 (48%)	38 (41%)	9 (8·1%)
Tolerated with difficulty	18 (9%)	3 (3·3%)	7 (6·3%)
Total	207	91	109

TABLE VIII—COMPARISON OF RESPONSES TO FERROUS SULPHATE AND FERROUS GLUCONATE

(Initial values were at 6 months' gestation)

—	No. of cases	Initial Hb (g. per 100 ml.)	Range of increase in 3 mos. (g. per 100 ml.)	Average increase in 3 mos. (g. per 100 ml.)
Ferrous sulphate	13	8·0–8·9	1·6–4·0	2·4
Ferrous gluconate	13	8·0–8·9	1·8–3·9	2·6

tablets † and instructed to take two tablets thrice daily. It was soon found that many women complained that they could not continue to take them, usually owing to nausea or vomiting. These women were then given either "molybdenised" ferrous sulphate ‡ or ferrous gluconate § in the same dosage (six tablets daily): 91 women were given molybdenised ferrous sulphate, and 109 ferrous gluconate, from the start of treatment. The rate of tolerance for these three compounds is shown in table VII. About half the women could not tolerate ferrous sulphate, and 41% could not tolerate molybdenised ferrous sulphate, but only 8% were intolerant of ferrous gluconate.

The hæmatological responses to each of these hæmatinics were compared. To eliminate error, only cases conforming to the following criteria were selected: (1) the hæmoglobin had been estimated monthly from the sixth to the ninth month of gestation; (2) six tablets had been taken daily with absence of intolerance; and (3) the initial hæmoglobin values had been comparable (8·0–8·9 g. per 100 ml.). Of the 397 anæmic women 31 fulfilled these criteria. 13 had been treated with ferrous sulphate and 13 with ferrous gluconate, and there was little difference in response (table VIII). It has been stated previously that ferrous gluconate gives a better response than does ferrous sulphate (Haler 1952, Lillie et al. 1954); but on further analysis little difference is evident. Previously reported differences are probably due to differences in toleration. The women treated with molybdenised ferrous sulphate are too few for comparison; but the average response of 5 of them, under the same criteria, was +2·2 g. per 100 ml., which was not significantly more than the response to ferrous sulphate. Other workers (Dieckmann et al. 1950, Benstead and Theobald 1952) have reported a better response with this preparation.

Saccharated oxide of iron ‖ was used intravenously whenever oral iron was not tolerated, when there was no response to oral iron, or when anæmia was discovered first in the last few weeks of pregnancy. Very few cases did not respond to one or other form of iron therapy, and these were all found to be cases of megaloblastic anæmia of pregnancy (Moore et al. 1955). The usual course of intravenous iron was an initial dose of 50 mg. followed by 100 mg. daily for the first week and thenceforward on alternate days for not more than three weeks. In all cases of iron deficiency the response was rapid. About 20 cases were treated in this way in the year (5% of the severe anæmias), and the average increase in hæmoglobin was 2·4 g. per 100 ml. in two or three weeks.

Discussion

This common anæmia in pregnancy is attributed to inadequate diet, and our findings support this explanation, though in a negative way. Doyle and McGrath (1954), who studied the same population, show conclusively a relation between defective diet and anæmia, and it has long been established that a diet poor in protein and iron is the cause of pregnancy anæmia (Strauss and Castle 1932, Bethell et al. 1939, Edwards et al. 1953). In fact the incidence of anæmia in pregnancy is a fairly reliable index of the standard of diet of the mothers.

If iron deficiency is slight, the hæmoglobin, though it decreases, may remain above 10 g. per 100 ml. and be considered "physiological." Davis and Jennison (1954) point out that even women with initial hæmoglobin levels of 10–13 g. benefit from iron therapy. We noted that with iron treatment the hæmoglobin rose in many cases to 12–14 g., well above the usual levels of the "physiological anæmia" of pregnancy. Benstead and Theobald (1952), Fisher and Biggs (1953), and Davis and Jennison (1954) have all drawn attention to this increase in hæmoglobin to normal (non-pregnant) levels in late pregnancy with efficient iron therapy.

It has been argued that a mild degree of iron deficiency is of little importance, and that in most cases women with it have successful pregnancies without trouble. On the other hand, it is obviously desirable that a woman should reach term with her full complement of hæmoglobin, and therefore be in a good state to withstand any abnormal blood-loss. It seems reasonable and good practice to give an efficient preparation of iron to every pregnant woman during the last trimester to counteract iron deficiency.

Summary

On first attendance at the antenatal department, Rotunda Hospital, Dublin, 1 out of every 4 women is anæmic.

The incidence of anæmia rises in the winter.

Breathlessness is the commonest symptom and appears to be related to the degree of anæmia, but many cases are without symptoms.

It is impossible to be sure of recognising anæmia by clinical means unless the hæmoglobin is below 6 g. per 100 ml. Hæmoglobinometry is essential. Spoon-shaped or breaking nails indicate long-standing anæmia.

A diet deficient in iron is the most important cause of this anæmia. A case is put forward for the routine administration of an efficient iron preparation in every pregnancy.

Ferrous gluconate was tolerated well in 90% of cases, whereas ferrous sulphate (whether molybdenised or not) was tolerated in only 50%.

In the absence of intolerance, there is little difference in the hæmatological response to ferrous sulphate and ferrous gluconate.

We are grateful to the master of the Rotunda Hospital (Dr. E. W. L. Thompson), whose coöperation made the investigation possible, and to the director of pathology (Dr. H. C. Moore) for his helpful criticism and his unfailing interest and assistance. A grant to one of us (E. W. L.) from the Medical Research Council of Ireland is gratefully acknowledged. Messrs. Evans Medical Supplies provided the ferrous gluconate.

† 'Ferosan' tablets (ferr. sulph. exsicc. *B.P.* gr. 3; cupr. sulph. *B.P.* gr. 1/32; mang. sulph. *B.P.C.* gr. 1/32).

‡ 'Moldomia' tablets (ferr. sulph. exsicc. 195 mg.; moybdenum sesquioxide 3 mg.)

§ 'Ferlucon' tablets (ferrous gluconate 300 mg.; aneurine hydrochloride 1 mg.).

‖ 'Ferrivenin.'

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TREATMENT OF MENTAL DISEASE BY SLEEP

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IN recent years sleep therapy has been studied increasingly both by clinicians and by research-workers. Complete monographs (Baumann 1953, Angel 1953), and even special issues of journals, have been devoted to the subject. But, though its value in certain disorders has been established, many theoretical aspects need further investigation, and much has still to be done to improve the results.

Historical

The method has a long history. Pierre Janet points out that the treatment of psychoses by prolonged sleep was practised in the early part of last century, when "animal magnetism" was in vogue. At the end of that century there was in Sweden a hospital (Janet calls it the Palace of the Sleeping Beauty) where prolonged sleep was the basis of all treatment. For mental illness rest in bed was introduced by Korsakov about that time, and came to be widely practised in Russian mental hospitals.

Pavlov's work on cortical inhibition and its protective and therapeutic nature supplied the scientific explanation of the method. Pavlov showed that inhibition was a protective physiological function developed by the nerve-cell in the course of phylogenesis. His work led clinicians to reject deep narcosis in favour of intermittent deep sleep lasting 10–20 hours daily, and to formulate indications for treatment.

The main indication for sleep therapy is in patients developing protective inhibition. Sleep therapy is less valuable in excited patients than in those showing depressive-inhibitory states. Treatment based on these principles was introduced in Ivanov-Smolensky's and Protopopov's clinics in 1943–46, and the same principles guide therapeutic practice in Soviet hospitals and clinics today.

Nevertheless, the simple formulation of the basic indications leaves many practical problems unsolved, since protective inhibition is seen in a variety of symptoms and syndromes, not all of which respond effectively to sleep therapy. Moreover, patients react very differently to any given narcotic: Baumann (1953) and others have shown that for patients with an excitable nervous system barbiturates seem most effective, whereas those in whom inhibition predominates respond best to chloral hydrate. Hence a wide range of soporific agents is needed.

So that we can use smaller doses of drugs, everything is arranged in the sleep-therapy wards to facilitate sleep. The action of the drugs is reinforced by monotonous stimuli—e.g., the sound of a muffled metronome or the flashing of a blue light—and by heat in the form of hot-water bottles or ozocerite poultices. Various methods of conditioned sleep are also employed.

Electro-sleep

In our investigations, attention focused first on "electro-sleep," developed in 1946 by Gilyarovsky et al. The results in 80 patients were discussed by my colleague Korkina. (Electro-sleep should not be confused with electro-narcosis, which we abandoned because of the serious risk of convulsions, opisthotonos, and subcomatose states.) Electro-sleep uses a weak electric current, applied as a rhythmic stimulus. A direct current is used, with square waves, an impulse duration of 0·2–0·3 milliseconds, and a frequency that can be regulated to 1–20 per second. The amplitude of the current varies from 5 to 15 mA. Electrodes are usually applied in the orbito-occipital position.

When the current is switched on, a slight pulsation is felt deep behind the eyes and a slight pricking in the eyelids. (I have checked this many times on myself.) After 15 or 30 minutes most patients begin to feel sleepy, and gradually they fall asleep. The sleep is often accompanied by dreams, and it may persist after the current is switched off. Some patients, on the other hand, never experience more than a feeling of drowsiness.

A course of treatment consists in ten to twenty daily applications, each lasting 2 hours. In severe insomnia the application is sometimes extended to 4 hours a day. With children the length of treatments is reduced to 40 minutes, and the amplitude does not exceed 5–6 mA.

Electro-sleep produces no clinical evidence of vegetative or somatic disturbance, and is apparently innocuous: experiments on animals have revealed no somatic contra-indications. We deem it prudent, however, not to use electro-sleep in patients with severe myopia, glaucoma, or gross cardiac insufficiency.

An electro-encephalogram taken immediately after a treatment shows a general reduction of cortical electro-activity. In some patients normal electrical activity was restored in the cortex after a period of heightened activity. This may be a peculiarity of electro-sleep, since reduced activity is usual after narcotic sleep. Investigations of neurodynamics by Ivanov-Smolensky's method (Kirilova) showed that electro-therapy often abolishes disturbances in differentiation: phasic phenomena disappear, and the tendency for conditioned motor reactions to become readily exhausted is corrected.

Results

The best results have been obtained with neuroses and psychogenic reactions displaying asthenia and asthenic depression but without severe psychotic features. Permanent benefit was not obtained in obsessional states. Presenile psychoses with anxiety or agitated depression often become worse, and in such states electrotherapy is contra-indicated. With schizophrenia, there is an improvement in the early neurotic-like phases, and in the reactive forms.

Among the advantages of electro-sleep are the almost complete absence of somatic contra-indications and the possibility of its use in outpatients. Drawbacks include the difficulty of regulating the depth and length of sleep, the fact that some patients do not sleep during the treatment, and the impossibility (for technical reasons) of applying it to disturbed patients, to patients with delusions of physical influences, and to patients showing negativism.

Mechanism

The mechanism of electro-sleep has not been fully explained. Gilyarovsky et al. (1952), as well as Servit (1954), who introduced the method in Czechoslovakia, emphasise the direct effect of the electric impulses on the brain. Other investigators deny the possibility of direct influence on the brain of such currents, and suggest that the effect is produced by weak rhythmical stimulation of the peripheral receptors. Observations at our clinic show that sleep can often be produced by the application of the electrodes to the forearms, without direct application of the current of the brain. Yet the fact that presenile patients get worse with this method suggests a central action of the current, since it is difficult to suppose that weak rhythmic stimulation of the peripheral receptors could have this effect.

Alcohol-induced sleep

Since 1949 we have in our clinic induced prolonged sleep by intravenous infusion of an alcoholic solution. The results in 150 patients were summed up by Ilyinsky.

Though alcohol has been used by many workers for the disinhibition, temporarily, of stuporose patients (Ivanov-Smolensky 1952, Gilyarovsky et al. 1952), it has not, so far as we know, been used routinely in sleep treatment. The following considerations led us to turn to ethyl alcohol as a sleep-producing medium in the treatment of mental disease, especially schizophrenia :

(1) Well-developed schizophrenia and alcoholism are seldom found together.

(2) Alcohol is an "endogenous" narcotic, in that it is a normal product of metabolism.

(3) The combustion of alcohol conserves other calorigenic substances, proteins in particular. It assists in the oxidation of glucose, and in its utilisation by the tissues (Meyer 1935, and others).

(4) Alcohol is a component of many blood-replacement fluids and medicines used to combat shock.

After studying the short-term and long-term effects of alcohol in dogs, and demonstrating the harmlessness of appropriate doses of the alcoholic mixture on ourselves, we proceeded to treat patients with intravenous infusions of the following mixture :

Pure alcohol 96%	60 to 120 g.
Sodium chloride	4 g.
Calcium chloride	1 g.
Glucose	25 g.
Distilled water	to 500 ml.

500 ml. of this mixture is given over a period of $1\frac{1}{2}$–2 hours. Daily infusions are made, with intervals of 1–2 days after each period of 4–5 days. A course of treatment comprises twelve to fifteen infusions.

Two phases are usually noted in the condition of the patient during each infusion : (1) the phase of disinhibition, which comes on after the administration of 200–350 ml., and (2) the phase of sleep, which comes on after 250–450 ml. In the first phase there is a combination of euphoria and sleepiness. In the second, the depth of sleep depends on the speed of the infusion. In some patients, and also if the infusion is given rapidly, the first phase is absent. The duration of sleep after each infusion is about 3–5 hours. In patients who formerly abused alcohol sleep may be delayed until as long as 40 minutes after the infusion is completed. Rarely it does not come on at all.

Results

Investigation showed that for 3–5 hours' sleep a blood-alcohol level of 100–170 mg. per 100 ml. was needed, which means that 1·2–1·8 g. alcohol per kg. body-weight must be introduced. During the injection there is flushing of the face and the upper part of the chest, moderate sweating, and diuresis. The blood-pressure falls by 10–20 mm. Hg, but returns to its previous level 2–3 hours after the end of the infusion. The patients' appetite is usually increased, refusal of food ceases, and they gain weight ; hence we use this method—but with a reduced dose—in weak, exhausted patients, and in those who refuse food ; and no other method gives such good results.

Among schizophrenics, good remissions were obtained in about half the cases. The best results were in patients with protective inhibition. Good results were obtained in 80% of a group of patients with psychogenic reactive states, mostly of a pronounced psychotic nature, and these patients were enabled to resume their former work. Less satisfactory results were obtained in patients in this group who had an environmentally conditioned hysterical reaction of primitive type. We do not, of course, treat children by this method.

There have been few complications : mild phlebitis has occasionally developed, and some patients have vomited after high doses of the alcohol. In some 2000 infusions we have never had occasion to use cardiac or respiratory stimulants. The commonest technical difficulty is to find suitable veins.

Amylobarbitone and Caffeine

In the past few years my colleague Yagodka has developed a method of using amylobarbitone ('Amytal') and caffeine—drugs which are usually regarded as of value only in the diagnosis of inhibitory states. We have used caffeine (0·2 g. intramuscularly) and soluble amylobarbitone (3–10 ml. of a 5% solution intravenously) routinely, in courses of 10 to 60 daily injections. A few minutes after the short-lived disinhibition and euphoria have passed, many patients doze off during the day and sleep significantly better at night.

This method does not seem to have a very wide scope in schizophrenia, but our results in 70 patients with neuroses, asthenia, and chronic reactive states were good. Obsessional states resistant to all other forms of treatment sometimes yielded to this method. Even temporary relief from painful experiences, by gradually abolishing the pathological conditioned reflexes, seems to hasten recovery.

Nitrous Oxide

Though the euphoric and narcotic properties of nitrous oxide were discovered more than 150 years ago, so far as we know no consistent efforts have been made elsewhere to use "laughing gas" in psychiatric practice. Our colleagues Zharikov and Matveyev have used it routinely in the treatment of depressive and agitated patients and those suffering from insomnia. As technical difficulties made it impossible to carry out a long course of treatment by inhalation of nitrous oxide, the gas was introduced subcutaneously, where it provided a depot that was later absorbed slowly into the tissues. Experiments on cats showed that 400 ml. of gas injected under the skin was absorbed by the end of 24 hours. Zharikov and Matveyev carried out many similar experiments on themselves.

Each injection is followed by a feeling of lightness and euphoria and eventually by sleepiness which lasts 4–6 hours. The following night sleep is deeper and longer than usual. When 300–500 ml. of gas is introduced under the skin there is a sensation of bubbles running in different directions, but crepitation disappears completely within 24 hours.

32 cases of mild reactive depression, involutional depression, and cyclothymia were treated, each receiving some 400–500 ml. of gas at each of 12 injections. It is too early to assess the results, but it is clear that sleep is improved. The patients often sleep for 2–3 hours after the injection, and many need less sedation at night. Most are improved in mood and experience a sense of well-being. Whether these effects are lasting cannot yet be stated.

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INTRA-ARTERIAL TRANSFUSION BY THE FEMORAL ROUTE

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As a means of combating arterial hypotension, intra-arterial blood-transfusion has been used for more than ten years. This method is needed but occasionally in cases of extreme emergency, and the femoral route offers many advantages, both in the ease of giving the transfusion and in the freedom from risk.

An apparatus simple to maintain and easy to use is essential. That described here fulfils most of the criteria of simplicity and safety. It can be constructed from standard blood-transfusion equipment with a few additions, and a stand for it is within the capabilities of most hospital workshops for the cost of a few pounds.

THE APPARATUS (fig. 1)

Positive pressure is provided by an aneroid sphygmomanometer. Between the inflated arm-band (which acts as an air reservoir to maintain constant rather than intermittent pressure) and the pressure-gauge is inserted a T piece which is connected to the air intake on the bottle. The bottle is held in a quick-release clamp in the stand so that no screw-top need be used to prevent leakage. The efferent tubing is led through a Macintosh valve, and a spring clip on a 1 in. length of rubber tubing is used to control its sidepiece. The tubing then passes to a 'Record' fitting, such as is used on standard blood-giving sets for connection to the needle. A Greenfield's lumbar-puncture needle has been found to be the most satisfactory. The stilette is modified so as to project for $^1/_2$ cm. beyond the end of the needle point and is rounded (fig. 2). Two artery clips are convenient for controlling the flow whilst filling—one above and one below the valve.

A two-way apparatus (fig. 3) has also been designed. This simplifies the giving of more than one bottle at a session by changing the positions of the clips. The second bottle can be given while the first is changed, and so forth.

Preparation for Use

The transfusion tubing, carrying valve and needle, are sterilised and kept in a drum. When the apparatus is required the proximal end of the tubing carrying the filter is inserted into the bottle. This slides into the screw clamp. Precautions must be taken to ensure that the ground glass plunger in the Macintosh valve is freely movable before blood is allowed to fill it. Air is excluded in the normal way and the distal end of the transfusion tubing is plugged into the sidepiece of the Greenfield's needle. The main channel of the needle houses the stilette which must be withdrawn before puncturing the vessel, and it is not until the needle is well within the artery that the position of the tap is changed so as to permit blood to enter the needle from the tubing.

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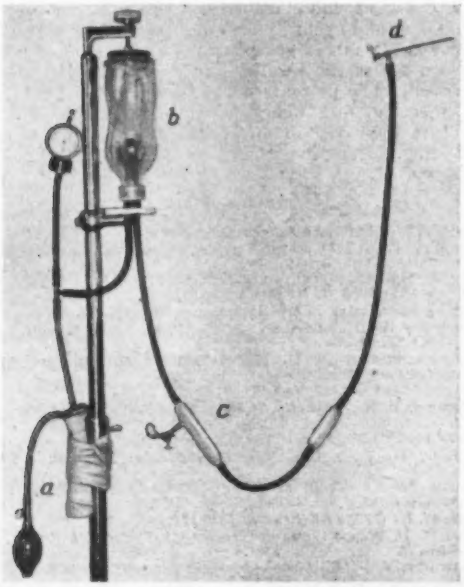

Fig. 1—The single apparatus: (a) aneroid sphygmomanometer, (b) bottle in quick-release clamp; (c) Macintosh valve; (d) Greenfield's needle.

Fig. 2—The needle and stilette.

TECHNIQUE OF ARTERY PUNCTURE

The femoral artery can usually be punctured percutaneously, and it may be made more prominent by external rotation and extension of the leg over a sandbag under the buttock. The needle should enter immediately below the inguinal ligament in an upward direction, since the femoral vessels rapidly recede beneath the adductors as they leave the femoral triangle and become relatively less accessible. If any difficulty is experienced in locating the artery or puncturing it, there should be no hesitation in cutting down and exposing it through a vertical incision downwards from the inguinal ligament at its mid-point.

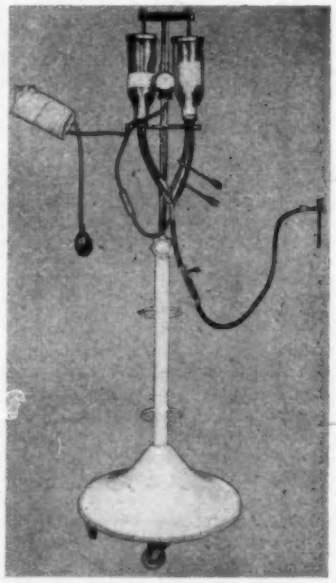

Fig. 3—The double apparatus.

The Greenfield's needle has been adopted since it has a wide enough bore to provide for rapid transfusion and is long enough to allow the operator to steady it easily whilst leaving $1^1/_2$–2 in. within the lumen of the artery. It has a short bevel and is unlikely to damage the opposite wall of the vessel as it enters. The stilette is removed and as the needle point enters the artery, arterial blood will spurt back. The stilette is immediately reinserted and with its round end projecting, the needle is advanced towards the umbilicus for 1 to 2 in. It is now firmly gripped by the vessel and need not be held. When it has been advanced to the desired point, the stilette is withdrawn and the tap turned through 90°, cutting off the open end of the needle and connecting it to the transfusion tubing.

The screw clamp on the stand absolutely prevents any leakage around the bung. It has not been found necessary to use locking connections on the rubber-tubing or to wire them, since if rubber and glass connections are chosen carefully they withstand pressure well up to the range required; and when the rubber perishes and starts to stretch it should be renewed.

A Macintosh valve renders air embolism almost impossible but a manually operated source of positive pressure has been selected since the need to maintain the pressure by hand will necessitate the constant presence of the operator.

ADVANTAGES OF THE METHOD

The femoral artery is the best site for intra-arterial transfusion for two reasons. First, the vessel is easily

punctured percutaneously in many cases and, even if cutting down is involved, this is a simpler and quicker method than cannulating a radial artery which may be in severe spasm (Porter et al. 1948) and less shocking than altering the position of the patient to allow transfusion by the lumbar route (Haxton 1953).

Secondly, the method is freer from complications—at any rate than the radial route.

Gangrene of finger-tips, and in one case of the thumb, has been reported after using the radial artery. In two cases (Porter et al. 1948, Seeley 1949) the use of dextran or plasma has been incriminated as the cause, and the gangrene appears to have been the result of perfusing a peripheral artery with unoxygenated fluid. One would expect there to be less danger of this when a large vessel such as the femoral is used and when there is adequate opportunity for the transfused fluid to mingle with oxygenated blood before being carried to the extremity of the limb.

In a further case (Bingham 1952) gangrene of the digit followed the use of blood, presumably owing to an anatomical anomaly—a further risk to radial-artery ligation.

Thrombosis of the femoral artery following intra-arterial transfusion has occurred in one case (Liaras et al. 1949). In this, the thrombosis was at the site of needle puncture (1 cm. below the inguinal ligament) in a patient of 72, after 250 ml. of plasma had been given. The proximal site of thrombosis seems to exclude the plasma as the cause, and the limb recovered after embolectomy. A massive extravasation of blood was found at the site of thrombosis which points either to leakage around a needle which was only just in the artery, or to damage to an atheromatous plaque. The former risk can be obviated by the technique I have described; the latter is intrinsic in the use of artery puncture in an atheromatous vessel. It has seldom occurred following the wide use of the femoral artery for arteriography.

Vascular spasm often follows puncture of the femoral artery but it can be expected to resolve spontaneously. Relief of spasm can be rapidly obtained by the direct application of papaverine (Kinmonth 1952) if the vessel has been exposed.

I am indebted to Prof. R. Milnes Walker, Mr. W. M. Capper, and Mr. J. A. Pocock, on whose patients intra-arterial transfusions have been performed; to Mr. R. E. Horton for help and encouragement in the preparation of this paper; to Mr. A. E. Christmas, F.I.B.S.T., who helped to design the quick-release clamp and built the single-headed apparatus; and to the group engineer's department at Southmead Hospital who built the double apparatus.

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DOES REDUCED BLOOD-SUPPLY CAUSE PAIN?

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DURING the past twenty years ischæmia has become a standard explanation for pain of unknown origin.

"Stitch" is said to be due to ischæmia of the diaphragm (Capps 1941); trigeminal neuralgia to paroxysmal ischæmia of deep facial structures (Karl et al. 1945); headaches to relative ischæmia of cranial muscles (Tunis and Wolff 1954). Non-articular rheumatism (Ray 1934), decompression pain (Kahlstrom et al. 1939), proctalgia fugax (Ryle 1942), dysmenorrhœa (Woodbury et al. 1947), and many other pains have been attributed to ischæmia.

But, apart from coronary insufficiency, intermittent claudication, arterial embolism and arterial spasm, few pains are certainly attributable to reduced blood-supply. In most cases we have no evidence of ischæmia and are guided chiefly by analogy—especially by the classical experiments on constriction-pain in working muscle (MacWilliam and Webster 1923, Lewis 1932, 1942):

The fist is repeatedly clenched while the circulation of the arm is arrested with a manometer cuff. There is no pain if the muscles are not worked; but the forearm muscles become painful and tender after 20 contractions—intolerably so after 40. When the cuff is released, the pain vanishes in 3 seconds.

Factor P is not Produced by Anoxia

Lewis believed that a chemical substance (factor P) was produced by working muscles without oxygen, and diffused out to the pain nerves in the tissue spaces. But the forearm is not ischæmic; it is congested with venous blood. Moreover, there is ample proof that the pain is not due to lack of oxygen:

(1) The pain comes after 20 contractions, whether the forearm is congested by a manometer cuff or exsanguinated by an Esmarch bandage (my observations).

(2) The pain comes after 35 contractions when the manometer pressure is at 50 mm. Hg—the circulation is not occluded (my observations).

(3) The pain appears after 60–100 contractions in a forearm exsanguinated by digital pressure on the brachial artery alone—not on muscles or nerves (Kelly 1955).

(4) Anoxia which causes dyspnœa and cyanosis does not accelerate the onset of pain (Harpuder and Stein 1943).

(5) The onset of pain is not accelerated by vasoconstriction or delayed by vasodilatation (Rein and Schneider 1937, Lewis et al. 1931, Harpuder and Stein 1943).

(6) Resting muscles, and even non-muscular tissues, generate pain when the constricted limb is put in hot water for 5 minutes (Harpuder and Stein 1943). After a shorter heat stimulus 8 to 12 contractions will generate pain.

Factor P is not a Circulating Biochemical Substance

Though factor P does not appear during 30 minutes' circulatory arrest, it remains stable (said Lewis) once it appears. Yet the pain vanishes as soon as the circulation is restored. Factor P is not a known metabolic product; the pain is not influenced by changes in the pH (Maison and Forster 1938) or by lactic acid or histamine (Harpuder and Stein 1943). Factor P cannot be detected in the circulating blood; Harpuder and Stein generated ischæmic pain in both legs and tried to flood the system by releasing both femoral cuffs at once. Then the usual 20 contfactions were required to generate pain in the forearm.

Can a stable chemical product become unstable when the blood flows? This would require its destruction by an anti-factor which had disappeared from the forearm yet is normally in excess in the blood. Such a potent substance would surely have been discovered ere this. The only other possibility (if factor P is a chemical substance) is that it is washed away—i.e., it must be diffusible. The chlorides of sodium and potassium are diffusible, and we know something about muscle pains which they cause:

(1) 1% potassium chloride solution injected into the nutrient artery to a muscle causes severe pain for 45 minutes (Harpuder and Stein 1943).

(2) Hypertonic saline solution injected intramuscularly causes pain for more than 30 seconds (Lewis 1942).

Therefore the pain from an undetectable circulating substance would not be likely to disappear in 3 seconds.

Factor P and Muscular Fatigue

Whenever I have made the experiment I have noticed a feeling of fatigue and muscular weakness increasing to paralysis. The increasing tightness of the cuff gradually merged with the fatigue into intolerable pain. I was once dissecting in tight rubber gloves, when the fingers became weak and almost paralysed; fatigue appeared in the forearms and progressed until it was exactly like ischæmic pain.

The muscles take 20 minutes to recover. If they are worked again in 10 minutes, the pain comes after 12

contractions ; and if they are fatigued from normal work, less than 20 contractions are required (Lewis 1942). Fatigue can do what neither vasoconstriction nor anoxia can do—intensify ischæmic pain. Fatigue is not only an inability to contract, it is also a muscular sensation which intensifies to pain and tenderness.

Partial Nerve-block

When the vessels are occluded, cutaneous sensory disturbances are produced by pressure on nerves (Lewis et al. 1931, Barlow and Pochin 1948, Sinclair 1948, Merrington and Nathan 1949, Addis et al. 1950). The forearm goes numb when the cuff has been inflated for 10 minutes, and for shorter periods after nerve injuries (Gilliatt and Wilson 1953, Marshall et al. 1954). Perhaps the pain and tenderness are also neural ; it is well known that muscles recovering from nerve injury are liable to fatigue and painful cramps.

When I partially blocked my ulnar nerve with procaine at the medial epicondyle, I felt aching pain in the hand and the ulnar side of the forearm after 30 clenchings of the fist. When my lateral popliteal nerve was compressed, and the ankle was rapidly flexed and extended, pain and tenderness developed in the anterior muscles but not in the calf (Kelly 1955). If the pressure was released while the movement went on, the pain vanished.

While the limb is constricted, there is an intensified electric discharge from the compressed nerve and its peripheral field (Kugelberg 1946). Muscular coördination is poor, and deep reflexes are absent (Gellhorn and Thompson 1944) ; muscles become weaker after 20 minutes even if they are not worked (Marshall et al. 1954). Painless lesions of skin (blister) and muscle (saline solution injected) become painful and generate more impulses (Nathan 1953). When he compressed the nerve alone Nathan generated muscular and cutaneous pain as before, though the circulation was free.

Heat, Hyperalgesia, and Factor P

The constricted limb becomes generally hypersensitive, skin hyperalgesic (Sinclair 1948), and deep wounds painful (Addis et al. 1950). Heat not only intensifies factor P in muscles, but also causes burning pain in a constricted finger (Harpuder and Stein 1943). Lewis (1942) showed that heat intensified erythralgic cutaneous hyperalgesia to burning pain ; the constricted finger and the ischæmic muscle are therefore hyperalgesic.

An artificial lesion in muscle becomes spontaneously painful (by summation) when its nerve is compressed (Nathan 1953). If a fatigued muscle is substituted for a tender spot, again the threshold is lowered by compression of the nerve. Muscular fatigue is therefore a hyperalgesic state which is intensified to pain by partial nerve-block.

Ischæmia is not a Common Cause of Pain

The causation of pain is usually multiple (Wikler 1953). Several subthreshold factors combine to give threshold stimulation. Often the cause which seems most likely is merely one of the effects of a deeper common cause. Cardiac pain is often due to reduced coronary circulation, but additional factors are required to precipitate the pain, which is absent for long periods in every case. Pain from arterial embolism (Lewis 1936) and intermittent claudication (Boyd et al. 1949) usually depends on factors additional to loss of blood-supply. In Raynaud's phenomenon lesions of nerves are partially responsible (Marshall et al. 1954). Causalgia after nerve injuries is not more common when the main artery has been severed (Sunderland and Kelly 1948).

When we say that a common but obscure pain (the stitch) is due to ischæmia of muscle, we are guided by analogy and not by observation. Deep and widespread pains are often associated with tenderness of muscles. Sometimes a primary muscular lesion is responsible for radiating pain and tenderness (Kellgren 1938). Sometimes, on the other hand, the muscular pain and tenderness are reflex—secondary to visceral or other deep lesions (Sinclair et al. 1948). Because we believe that ischæmia causes pain and tenderness in working muscles we assume that it causes many other pains. If, however, the pain is not ischæmic but neural, clearly we shall have to discard ischæmia as a common cause of pain.

Summary

Ischæmic muscles can be exercised without pain for considerable periods if their nerve-supply is undamaged.

Pain develops in muscles which are worked with free blood-supply but with nerves partially blocked.

So-called ischæmic pain in muscles is due chiefly to fatigue through partial nerve-block.

Factor P cannot be detected in the circulating blood.

There is no evidence that ischæmia is a general cause of obscure pains.

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A CASE OF FAVISM

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FAVISM is a disease in which acute hæmolysis follows the ingestion of broad beans (*Vicia fava*) or inhalation of their pollen. It is seen chiefly in Sardinia, but also in Sicily, Italy, Greece, and North Africa (Luisada 1941). Sporadic cases have been reported from France and Spain, 10 have been described in the United States (Larkin 1953), and 2 in Britain (Diggle 1953). All those affected were people of Mediterranean ancestry.

Symptoms appear 5–24 hours after ingestion of the beans, or in a matter of seconds after inhalation of their pollen. There is malaise, nausea, and vomiting. Pyrexia, if present, is irregular. The patient becomes jaundiced, and his liver and spleen may enlarge. There is a fall in the red-cell count, a rise in serum-bilirubin and serum-potassium, a reticulocytosis, and often a leucocytosis. The urinary urobilin may increase, and albuminuria and hæmoglobinuria may be present. An increased

red-cell fragility may be found in the early stages, but usually fragility is normal.

The severity varies from the acute case, requiring blood-transfusion, to mild ambulatory cases with few signs. The disease is commonest in male children during the pollen season (May to August). Skin-testing with an extract of the bean or pollen gives variable results. Each attack is followed by a period of about 6 weeks' immunity from the disease, during which time skin-tests are negative.

The condition is usually regarded as a manifestation of allergy, though this is not accepted by all authorities (*Journal of Pediatrics* 1954).

Case-record

A 9-year-old boy was admitted to hospital on July 2, 1954, for investigation of recurrent attacks of jaundice.

His present illness had begun on June 26, 1954. At supper on that day he ate some cooked home-grown broad beans and during the evening he felt rather unwell. Next morning he ate some more beans, and about 2 hours later he had a shivering attack and felt ill. He went to bed early and the following morning (June 28) he was found to be jaundiced. He vomited several times during that day and night, and then slowly improved. By July 1 the jaundice had begun to fade.

Previous history.—He had had jaundice twice before, in 1952 and in 1953, each time during the late spring. Both attacks were closely preceded by a meal containing broad beans, and each attack consisted in shivering, malaise, vomiting, and jaundice. Neither had been as severe as the 1954 attack, and on neither occasion was a doctor called.

Family history.—His mother volunteered the information that her maternal uncle used to become ill and jaundiced every time he ate broad beans. He was unmarried and died some years ago. So far as she knew, no-one else in the family had had recurrent jaundice. The patient was born in England and had lived all his life in England. His parents, grandparents, and the grand-uncle's parents had all been born in the British Isles.

On examination, he was slightly above average height and weight for his age. The scleræ were yellow and the skin slightly so. The liver edge was palpable just below the costal margin, and was tender. The spleen was not palpable, and no other abnormality was found on physical examination.

Blood examination on July 5 showed Hb 74%, red cells 3,400,000 per c.mm., reticulocytes 24%, and serum-bilirubin 0·3 mg. per 100 ml. Examination on July 7 showed reticulocytes 19%, normal red-cell fragility (hæmolysis starting at 0·44% and complete at 0·28%), white cells 8700 (polymorphs 50%, lymphocytes 42%, monocytes 6%, eosinophils 2%), red cells normal in shape and size, and no punctate basophilia. The anti-globulin reaction was negative. By July 16 the reticulocytes had dropped to 1·5%. Wassermann and Kahn reactions were negative.

Other examinations.—There was no bilirubin or urobilin in the urine. An intradermal skin-test on July 15, using an extract of broad beans, was negative.

Progress.—There was an evening rise of temperature, up to 99·6°F, for a few days. The jaundice cleared within 24 hours of admission. There were no further symptoms and signs, and he was therefore discharged on July 18, having been warned never to eat broad beans again.

On Sept. 9 he was seen as an outpatient. He had remained fit in the interval. A further skin-test was negative. Blood examination showed Hb 106%, reticulocytes less than 0·2%, serum-bilirubin 0·8 mg. per 100 ml., normal red cells and platelets, and no evidence of spherocytosis.

Discussion

The diagnosis was made (1) on the history of symptoms appearing within 24 hours of eating broad beans; (2) on the evidence of hæmolysis as shown by the low hæmoglobin, the low red-cell count, and the high reticulocyte-count; and (3) on the absence of excessive fragility or abnormal shape of the red cells. The negative anti-globulin reaction on July 7 was to be expected, since the hæmolytic episode was over by that time.

This is probably the first case of favism to be described in a person of non-Mediterranean descent. The diagnosis might not have been made but for the mother's insistence on the connection between the beans and the jaundice (she probably recalled that her uncle had shown a similar susceptibility).

Diggle (1953) has pointed out that where hæmolytic anæmia is found in a person of Mediterranean ancestry, the possibility of favism should be borne in mind. Dacie (1954) noted that in many of the published case-reports on favism, the original diagnosis had been of "acute hæmolytic anæmia—? Lederer's type"; the correct diagnosis was made after eliciting a history of recent ingestion of beans.

This case suggests that favism should be considered as a cause of hæmolytic anæmia not merely in Mediterranean people or their descendants but also in persons of British stock.

Summary

A case of favism is described in an English boy of 9. This is the first report of the condition in a patient of British descent. There are grounds for believing that the boy's grand-uncle had the same disease.

Favism should be considered as a possible cause of hæmolytic anæmia and unexplained jaundice, even in patients who are not of Mediterranean stock.

I am indebted to Dr. G. A. Emmerson, under whom the case was admitted, for permission to publish this report, and to Dr. G. A. Harrison and Dr. Colin Knowles, who were responsible for the pathological investigations.

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PEPTIC ULCER IN A HÆMOPHILIAC TREATED BY GASTRECTOMY

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THE danger of bleeding after injury in hæmophilia has long been known, and Birch (1937) reported many deaths following even minor surgery.

Craddock et al. (1948), reviewing the problem of surgery in hæmophilia, drew attention to the greater risks of bleeding in cases where local hæmostatic measures could not be applied: an arm was successfully amputated in a hæmophiliac, but in abdominal surgery the danger of hæmorrhage was so great that many authorities regarded the risks attending infection in acute appendicitis as less serious than those attending operation. Craddock et al. also described their own case of acute appendicitis treated by operation, in which the clotting-time was kept within normal limits by the use of fresh blood, plasma, and antihæmophilic globulin, and yet the patient died. At necropsy blood was found in the peritoneum and pleura, and a large hæmatoma, not communicating with the peritoneum, was found at the site of the incision. They calculated that the mortality-rate associated with abdominal surgery in probable hæmophilia was at least 27%, but where only proved cases of hæmophilia were considered the mortality-rate was 60%.

I describe here a case of repeated hæmatemeses due to peptic ulcer in a hæmophiliac who subsequently underwent gastrectomy. Although the operation was successful I am convinced that surgery in hæmophilia must be avoided if at all possible.

Case-report

The patient, who was in his early forties, came from a family of bleeders. The family history is typical and illustrates the transmission of hæmophilia by unaffected females to their male children (fig. 1). Both the maternal grandfather and a great uncle were said to have died from bleeding, but the exact circumstances are unknown.

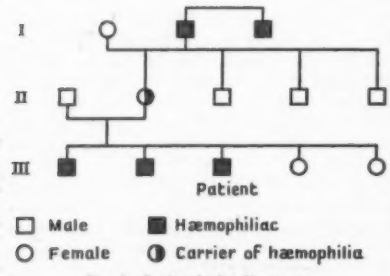

Fig. 1—Patient's family tree.

History of Bleeding.—Although never a florid hæmophiliac the patient has had recurrent epistaxes, skin hæmorrhages, and, at the age of 21, a hæmarthrosis of his left knee. Superficial wounds on many occasions bled unduly but never gave rise to anxiety; in fact, severe lacerations did not require any special treatment to produce hæmostasis. The bleeding-time was repeatedly normal, whereas the clotting-time was often prolonged. In September, 1952, his clotting-time (Lee and White) was 9 minutes (normal 5–10 minutes), bleeding-time 2 minutes, clot-retraction normal, prothrombin and fibrinogen 93% and 0·2 g. per 100 ml. respectively, and prothrombin consumption 30%. In view of the normal clotting-time specimens of his blood were sent to Dr. R. G. Macfarlane and Dr. Rosemary Biggs at the Radcliffe Infirmary, Oxford. They confirmed the diagnosis of hæmophilia: "Our tests show that he has a definite deficiency of antihæmophilic globulin, in other words he has classical hæmophilia. The results cannot at present be expressed quantitatively."

History of Dyspepsia.—For 20 years the patient had symptoms typical of duodenal ulcer, which had been repeatedly demonstrated by barium meal. 7 years ago he had a perforated duodenal ulcer, which was sutured, fresh blood being given before operation. In the seven years from the perforation to the present illness he had eleven hæmatemeses; seven were serious and necessitated admission to hospital and nearly always blood-transfusions. The amount of blood given varied: at first as little as 3 pints was required, but on each of the two most recent admissions—i.e., August and October, 1952—more than 20 pints was needed. Fresh blood from emergency donors was used whenever possible. It was not uncommon for the patient's Hb level to be as low as 4·5 per 100 ml. after hæmatemesis. The duration of his stays in hospital varied from 10 to 40 days. Continuous medical treatment, including prolonged periods of rest, did not produce appreciable improvement; in fact, the hæmatemeses became not only more frequent but also more severe. The patient was virtually unemployed, and his family life was becoming disrupted. Moreover, Prof. F. J. Nattrass felt that sooner or later the patient would die from a hæmatemesis, and that therefore the considerable risk of gastrectomy was justified.

Admission for Gastrectomy.—Preparations to control bleeding during and after gastrectomy were made on the assumptions that (1) the clotting-defect in hæmophilia is due to the lack of antihæmophilic globulin; (2) provided antihæmophilic globulin can be maintained at an adequate level, the clotting and other hæmostatic mechanisms are normal; (3) antihæmophilic globulin is present in freshly collected blood, but after storage its concentration tends to fall (although this is a variable factor); purified antihæmophilic globulin is not available in large quantities and that present as a contaminant of purified fibrinogen has been inconstant and disappointing in controlling bleeding in hæmophilia; (4) antihæmophilic globulin is only effective for 24–48 hours after injection, and is probably much less than this (R. G. Macfarlane, personal communication); and (5) relatively large amounts of human blood are necessary to provide enough antihæmophilic globulin to overcome the clotting-defect in hæmophilia (Dacie 1952), and small amounts of blood or plasma as recommended by Schiller et al. (1948) are unreliable. It was realised that repeated transfusions of plasma might lose their effect as the result of the patient's becoming immunised to antihæmophilic globulin, but this risk was unavoidable and accepted, as were those of plasma hepatitis, &c.

Preoperative Preparation.—Twenty emergency blood-donors were tested to make sure that their blood was compatible with the patient and with each other, and that their plasma could promote normal clotting of his blood. On the day before operation blood from twelve such donors was collected into acid-citrate-dextrose solution and within three hours transfused into the patient by exchange transfusion. The technique was simple, siliconed giving and taking sets being used to withdraw blood from one arm while the fresh blood was run into the other. There were no technical difficulties, and the rate of bleeding was controlled by altering the tension of the tourniquet, and the rate of infusion by positive pressure. An exchange of 10 pints was completed in 80 minutes, after which the remaining 2 pints was run in by slow drip. By this procedure normal blood was substituted for at least 60% of the patient's blood. Perhaps a similar quantitative result might have been achieved by transfusing about five pints of fresh plasma. However, the exchange transfusion did not upset the patient; and since it was completed within an hour and a half, he obtained a good night's rest before operation.

Partial gastrectomy was done by Prof. Norman Hodgson on Jan. 26, 1953, at 9.30 A.M., 20 hours after the exchange transfusion was completed. It would probably have been wiser to operate immediately after the transfusion. During the operation 1 pint of blood, collected on the previous day from a selected donor, was given. There were many more adhesions between the liver and the whole of the lesser curvature than are usually seen after a perforation. When these were separated, the stomach was seen to be dilated. The duodenum showed stenosis due to a chronic ulcer in its first part, and was slightly adherent to the pancreas but easily separated. The duodenum was divided and closed without difficulty. On exposure of the lesser curvature a greyish swelling of unknown nature was found and removed with considerable difficulty, together with the stomach. An anastomosis was made by bringing the jejunum through the transverse mesocolon. A Penrose drain was inserted down to the stump of the duodenum, and the abdominal wall was sutured in layers. During the operation the bleeding was no more severe than usual, and the blood appeared to coagulate in normal time.

Postoperative Course.—During that afternoon 1 pint of blood, collected on the previous day, was given and followed by 1 pint of saline solution. At 6.15 P.M. the patient vomited bloodstained material, and thereafter small amounts of bloodstained fluid were aspirated from the "stomach"—about 1 oz. every 15 minutes, 33 oz. being withdrawn by midnight. Thereafter the bleeding seemed to increase, because sometimes 4 oz. was aspirated in 15 minutes. So a transfusion of bank blood was started, 2 pints being given over the next 6 hours, after which saline solution was substituted for blood (fig. 2).

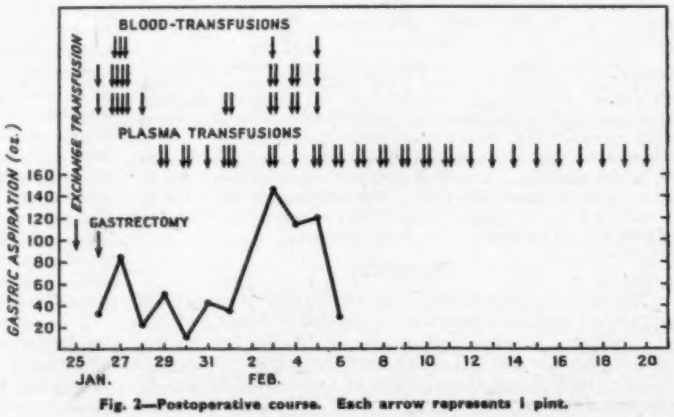

Fig. 2—Postoperative course. Each arrow represents 1 pint.

Next day 37 oz. of deeply bloodstained material had been aspirated from the stomach since midnight, and the patient was in a state of profound circulatory collapse, semiconscious, and very apathetic, with pulse-rate 140 and systolic blood-pressure 90 mm. Hg. A transfusion of bank blood was again started, 1 pint being given in 10 minutes and 2 more in the next hour, followed by 750 mg. of fibrinogen (M.R.C. Blood Products Unit), which contains antihæmophilic globulin, and by 2 pints of blood freshly collected from specially selected donors. The patient improved and was conscious, but with blood-pressure 110/70 mm. Hg and pulse-rate 120. Later that day 4 pints of fresh blood was given, and a rectal drip of tap-water was started because the patient was becoming dehydrated. The "stomach" was aspirated hourly, deeply bloodstained material being obtained on every occasion until 8 and 9 P.M. During this day the patient had 84 oz. withdrawn and received 5 pints of bank blood and 6 pints from emergency donors; in fact his entire blood volume was replaced. In addition, he was given 750 mg. of fibrinogen, which in antihæmophilic content is said to equal 500 ml. of plasma, but in fact is probably equal to only 50 ml. of plasma (R. G. Macfarlane, personal communication).

From Jan. 28 to Feb. 1 the patient was much better, rational, and reasonably coöperative, but still very anxious. He was given 1 pint of fresh plasma morning and evening—i.e., about every 12 hours. The plasma used was of the same ABO and Rh groups as the patient's but not cross-matched. Freshly collected blood from two donors was centrifuged and the plasma siphoned off and pooled. A new drip, using a small needle, was set up on each occasion, the transfusion taking about 20 minutes. During these five days the patient's condition remained satisfactory, although about 30 oz. of bloodstained fluid was aspirated daily. Throughout this time 2 oz. of either water or orange-juice was offered each hour. On the day of operation the patient took only 2 oz., but next day he took 20 oz. and thenceforth he gradually increased his intake to about 60 oz. a day.

On Feb. 1, in addition to the fresh plasma, he was given 2 pints of day-old blood to counteract mild anæmia. He seemed well, the operation wound was healing normally, and there was no bleeding. The transfusions were therefore discontinued.

Next day his condition was satisfactory and no bleeding occurred, but on Feb. 3 at 7.15 A.M., 34 hours after the last plasma transfusion, he vomited 18 oz. of blood, and 18 oz. more was aspirated in the next 15 minutes; so 1 pint of plasma (18 hours old) was given at 9.30 A.M. and 1 pint newly collected from emergency donors at 10 A.M. In spite of this 20 oz. of bloody fluid was being aspirated every half-hour, the blood-pressure was falling, and the pulse-rate was 120. A transfusion of fresh blood from emergency donors was started at 12.30 P.M., 5 pints being given, and 145 oz. of fluid being aspirated from the "stomach," during the day.

On Feb. 4 1 pint of fresh plasma and 4 pints of fresh blood were given and 114 oz. aspirated. On Feb. 5 1 pint of fresh plasma was given in the morning, 3 pints of fresh blood during the day, and 1 pint of fresh plasma in the evening; and 121 oz. was aspirated. On Feb. 6 the patient's general condition and mental outlook had much improved, 1 pint of fresh plasma was given in the morning, and at 10 A.M. 30 oz. of fluid was withdrawn, after which no further aspiration was required. Another pint of fresh plasma was given in the evening.

From Feb. 7 to Feb. 11 1 pint of fresh plasma was given each morning and evening. On Feb. 11 the wound was healing normally, and the last of the sutures were removed. From Feb. 12 to Feb. 22 one pint of fresh plasma was given each evening. By Feb. 12 the patient's weight, normally 11 st. 4 lb., had decreased to 10 st., but on this date he started to take food by mouth once more. On the six consecutive days up to Feb. 22 tests for occult blood were negative. The plasma transfusions were stopped after Feb. 22, and there was no further bleeding. The patient progressed well and was discharged home on Feb. 27, a month after admission, during which time he had received 39 pints of blood and 38 pints of fresh plasma. This represents more than 100 donations of blood, and but for the donors it is unlikely that he would have survived.

Follow-up.—The patient was seen at monthly intervals for 6 months and, apart from a feeling of fullness and some vomiting after meals, remained well. His stools were tested for occult blood during the first three months' convalescence but were negative on each occasion. His appetite was satisfactory, he was gaining weight, and no anæmia developed. Seen in October, 1954, 21 months after gastrectomy, he said he felt perfectly well and was doing heavy manual work without difficulty. He weighed 11 st. 4 lb. (his normal weight) and had no complaints.

Discussion

It is difficult to overestimate the risk attending surgery in hæmophilia. Even if the clotting-time is nearly normal, or can be maintained within normal limits by injections of fresh plasma or of antihæmophilic globulin, severe bleeding may still occur (Merskey 1951, Baserga and de Nicola 1951).

Until potent antihæmophilic globulin is available in large amounts, fresh plasma is the best means of supportive treatment in the case of accidental injury or if operation cannot be avoided. Very large amounts of fresh plasma are required and should be given frequently—e.g., every 12 hours—because the active principle survives only a few hours and therefore may fall to dangerously low levels between transfusions. Transfusion therapy should be continued as long as there is evidence of bleeding and until it is reasonably certain that healing is well established. It is important that during the operation the circulating blood should contain adequate amounts of antihæmophilic-globulin because otherwise arterial hæmorrhage is very likely to recur.

Macfarlane et al. (1954) have reported the value of bovine and antihæmophilic globulin in patients undergoing surgical treatment, and it seems that this is the real hope for these unfortunate people. At present it is not available in large amounts, and in some cases it seems to carry the risk of producing thrombocytopenia, although in none of these workers' cases did this cause bleeding.

Any method by which antihæmophilic globulin is introduced into a patient to whom it is a "foreign protein" carries the risk that the patient may become immunised to it and therefore no longer derive benefit from it.

Summary

A case of repeated hæmatemeses due to duodenal ulcer in a hæmophiliac is reported.

Eventually gastrectomy was done. The régime before and after operation is described.

The need to avoid major surgery in hæmophilia at practically any cost is emphasised.

I am indebted to Professor Nattrass and Professor Hodgson for permission to publish; Dr. R. G. Macfarlane and Dr. Rosemary Biggs for confirming the diagnosis of hæmophilia; the Regional Transfusion Centre for their service; and the doctors and nurses of the Royal Victoria Infirmary for their skill and care in looking after the patient.

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"There is one possible consequence of the use, or the testing, of thermo-nuclear weapons which is seldom mentioned but which must be in the minds of some biologists. It has to do with the effects of radiations upon symbiotic and parasitic organisms . . . Now, living things live together in relationships which have themselves become adjusted over long periods of selection. Many trypanosomes, for instance, do little harm to the hosts in which they live. A mutation in a population of trypanosomes resulting in the production of a new viable form can have very serious consequences for the host population, which may be faced with a new situation with which it is not fitted to cope.—Prof. PAUL G. ESPINASSE, *Manchester Guardian*, March 31, 1955.

Reviews of Books

British Practice in Radiotherapy

General Editors: SIR ERNEST ROCK CARLING, LL.D., F.R.C.S., F.R.C.P., F.F.R., consulting surgeon, Westminster Hospital; B. W. WINDEYER, M.B., D.SC., F.R.C.S., F.R.A.C.S., F.F.R., professor of radiology, University of London; D. W. SMITHERS, M.D., F.R.C.P., F.F.R., professor of radiotherapy, University of London. London: Butterworth. 1955. Pp. 516. £4 5*s*.

SIXTY-FIVE authorities have contributed to this picture of radiotherapy practice in Great Britain today. The volume, though complete in itself, is also a companion to *British Surgical Practice*.

Part I deals with general problems, including the basic physical aspects, biological problems and effects, and methods of application. Part II is concerned with treatment. Systematically each chapter deals with a subject for which radiotherapy is used, and its use is discussed fully and clearly by a physician or surgeon and a radiotherapist. The necessary and growing coöperation between radiotherapy and other departments is stressed throughout. The chapters on cancer of the uterus and breast, on the nose and nasal sinuses, and on chronic rheumatic disease are especially clear and informative. The chapter on records and presentation of results is also useful. Surprisingly there is no section on the treatment of salivary-gland tumours.

The diagrams, tables, and illustrations are as clear and lucid as the text. This excellent book can be recommended not only to the radiotherapist but to all those who send patients to the radiotherapy department.

Human Limbs and their Substitutes

Editors: PAUL E. KLOPSTEG, PH.D., SC.D., director of research, Northwestern Technological Institute, Evanston, Ill.; PHILIP D. WILSON, M.D., surgeon-in-chief, Hospital for Special Surgery, New York. New York and London: McGraw-Hill. 1954. Pp. 844. 96*s*.

UNTIL lately the design, manufacture, and fitting of artificial limbs, and the training of amputees in their use, were in the hands of firms making such appliances and a few limb-fitting surgeons. The craft had developed empirically, and though the product was tolerably satisfactory it was without a scientific basis. The surgeon-general of the United States army determined at the end of the late war that his pensioners should have the best that man could devise, so he enlisted the aid of the National Research Council. The council has carried out one of the most elaborate and comprehensive investigations ever made into a single aspect of human behaviour. The scheme, ambitious in conception, and far beyond the scope of individual enterprise, is an outstanding example of the possibilities of research organised at national level and sponsored by national bodies. It has covered fundamental research into every aspect of all the problems of the amputee; and it has called for the integrated work of orthopædic surgeons, anatomists, neurologists, psychologists, civil engineers, plastic engineers, physicists, and manufacturers. This volume reports the results of seven or eight years' work by the different groups.

There are chapters on the mechanics of muscles and of locomotion; new developments in artificial legs, arms, hands, and hooks; the technique of cineplasty; the electric arm; suction sockets; the prescription, alignment, and fitting of prostheses; the evaluation of new devices; and many others. Much of the work is highly technical; it reports basic observations not yet directly applicable to the construction of prostheses, and some which, though still experimental, point the way for future development.

Dr. Klopsteg and Dr. Wilson, an engineer and a surgeon, have done a magnificent job in presenting such a heterogeneous mass of material as a coherent story. The book is indispensable for everyone concerned with artificial limbs, and no orthopædic surgeon can afford to neglect the basic research in human physiology and mechanics that it reports.

Textbook of the Rheumatic Diseases

2nd ed. Editor: W. S. C. COPEMAN, O.B.E., M.D., F.R.C.P., senior physician, Arthur Stanley Institute for Rheumatic Diseases, Middlesex Hospital. Edinburgh and London: E. & S. Livingstone. 1955. Pp. 754. 52*s*. 6*d*.

THE first edition of this textbook was published just before cortisone and corticotrophin made their début. In the second edition the place of these hormones in treatment is considered by several of the 26 contributors who form Dr. Copeman's authoritative team.

The book is a series of essays, and some overlapping has been accepted and encouraged; thus each section stands by itself as the considered statement of an expert surveying familiar territory, and not subjected to undue editorial restraint. The reader in search of a complete picture of the treatment of rheumatoid arthritis must be prepared to wend his way from a general chapter on the disease to others on hydrotherapy, physical medicine, and orthopædics. A minor criticism is the mixing of positive and negative reproductions of radiographs throughout the book, even on facing pages. The difficult task of surveying the whole subject of the adrenal hormones has been attempted in a new chapter. There are some misleading statements in this account, particularly on the effect of adrenal hormones on antibody production and on reactions of hypersensitivity. The only work on antibody production cited is the old observation of a rise in titre associated with the lympholysis induced by adrenal stimulation. This phenomenon has never been confirmed, and more recent and important work on the depression of antibody production by cortisone is not mentioned. There is some apparent confusion between the effects of cortisone on tuberculin sensitivity and on susceptibility to the spread of tuberculous infection. In a short description of collagen diseases "hyaluronidase" is used where hyaluronic acid is intended, and fibrinoid degeneration is rather loosely defined. Fortunately a clear and accurate account of connective-tissue pathology is included in a separate chapter.

This work has deservedly secured its place as a standard textbook, and the appearance of this up-to-date second edition is timely.

Insanity, Art and Culture

FRANCIS REITMAN, M.D., D.P.M. Bristol: John Wright & Sons. 1954. Pp. 111. 12*s*. 6*d*.

THE influence of a particular culture upon the artistic productions of the mentally ill is a special case of the more general problem of artistic creation in different societies. Dr. Reitman has assembled paintings and drawings by psychotic patients in Mexico, East Africa, Egypt, India, Ceylon, Japan, and New Zealand; in all these, of course, occidental influences have to be reckoned with to some extent in the prevailing culture.

The material was not large enough to allow quantitative analysis; but the qualitative characteristics of schizophrenic painting were present in the production of the Egyptian, Indian, Sinhalese, and Japanese patients, though some features that would be indicative of illness in a European patient reflected normal cultural forms when they occurred in the production of the oriental patients. Dr. Reitman then examined the influence of the artistic medium by comparing psychotics' paintings with their needlework and scripture; and he expresses the surprising opinion that "in our present day cultural pattern there seems to be little to stimulate activity in any visual art other than painting." In succeeding chapters there are brief accounts of the lives of Alfred Kubin and George Morland in relation to their artistic activity; some reflections on drawings and paintings carried out "automatically" as in a trance or while doodling; and a somewhat irrelevant sketch of Mytton, the well-known eccentric. The book, which contains suggestive ideas about the diagnostic value and the complex sources of artistic production, would gain by a fuller consideration of some previous writings, such as those of Kreyenberg, Morgenthaler, and Pfeifer.

Proceedings of the International Congress of Physical Medicine.—The proceedings of this congress, which was held in London in July, 1952, have now appeared. Copies (30*s*. post free) may be had from the International Federation of Physical Medicine, 45, Lincoln's Inn Fields, London, W.C.2.

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Lancet, 1954, *i*. 1011

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THE LANCET
LONDON: SATURDAY, APRIL 9, 1955

Mental Nursing Analysed

Bethlem Royal Hospital and the Maudsley together form a centre of teaching and research so outstanding that one might suppose they would never want for nursing staff. Yet the recruitment problems which are so acute throughout the mental service have affected them too; and in 1951 the board of governors of the joint hospital arranged for a job analysis of their nurses' work. Their aim was to gain information that would help them in formulating their nursing policy and training procedures; and the results of the analysis (which was made in 1951–52) have led them to make considerable changes. Believing that the findings can be of use to other mental hospitals, they now, with great public spirit, present a condensed report [1] of this, the first inquiry of its kind into the work of mental nurses. Like the Nuffield [2] job analysis of the work of general nurses, it brings its shocks; and if, in drawing attention to these, we seem to criticise the practice of these hospitals, it must be borne in mind that it is their *former* practice that is under discussion; and moreover that the training given to nurses in them, even before 1951–52, was probably better than that given in many other mental hospitals now.

The most striking finding of the Nuffield report was that three-quarters of the nursing in general hospitals was being done by student nurses; and this new report shows that in mental hospitals, too, a large part of the care of patients falls to unqualified nurses.

Nurses are classed as: ward sister or charge male nurse; senior nurse (either a staff nurse or a student nurse in her last year of training, who is second in charge of the ward); middle-rank nurse; junior nurse (the youngest in experience on the ward); and part-time nurse. Their tasks are grouped under the headings: care of patients; supervision; household duties (among which are included, somewhat surprisingly, bedmaking and the serving of meals and drinks); duty-room work (that is, the writing of reports and notes); and reception and management. At the time of the survey sisters spent the largest slice of their lives on the last of these (61% of their time at the Maudsley and 34% at Bethlem); the figures for care and supervision of patients by sisters in the two hospitals were only 12% (Maudsley) and 30% (Bethlem). Senior nurses spent 15–17% of their time on reception and management; but the amounts they spent on care and supervision of patients were strikingly different in the two hospitals—22% at the Maudsley and 53% at Bethlem. Middle-rank nurses had a similar pattern, spending 7–10% on reception and management and 48% (Maudsley) and 61% (Bethlem) on care and supervision. Junior nurses spent only 5–6% of their time on reception and management, but 42–51% on care and supervision of patients. The number of hours worked by part-time nurses differed considerably in the two hospitals. Though some of them were trained nurses, they spent much time on household duties (44% at Bethlem, 57% at the Maudsley). At Bethlem most of their remaining time went on care and supervision of patients, but at the Maudsley only a quarter of their time was spent in this way.

1. The Function and Training of Mental Nurses. By A. N. OPPENHEIM with the assistance of BERYL EEMAN. London: Chapman & Hall on behalf of the Bethlem Royal and the Maudsley Hospitals. 1955. Pp. 85. 12*s*. 6*d*.
2. The Work of Nurses in Hospital Wards. London: The Nuffield Provincial Hospitals Trust. 1953. See *Lancet*, 1953, i, 379.

From the standpoint of the hospitals, there was nothing much wrong with the arrangement whereby the nurses who spent most time with the patients were those of the middle and junior ranks, and (at the Maudsley) part-time nurses. Patients need sympathetic company, which kindly young people are quite able to supply; the technical aspect of treatment is in the hands of the doctors; and any junior nurses who have the care of patients recovering from physical treatment learn from their seniors what is required of them. On the other hand, the young girl—and even the young man—without previous nursing experience may see the situation rather differently. Lay people, among whom untrained entrants must be classed, are ill at ease with those they suppose to be mentally disordered, and the new nurse needs a brief course to orient her to her work—some guidance, for example, in recognising guilt and anxiety, and some notion of the ways in which these are augmented or reduced. Admittedly, during her 8 weeks in the preliminary training school (P.T.S.) she would hear the sister-tutor lecture (for about $1\frac{1}{2}$ periods a week, usually on Saturdays) on various aspects of mental illness; but the official syllabus for the preliminary State examination, to which the course otherwise adhered, contains no mention of psychology or psychiatry. In any case, even at Bethlem and the Maudsley, new nurses did not necessarily begin their training in the P.T.S., but might reach it only after several weeks, or even months, of work in the wards. To have to deal with mental patients without sufficient preparation must be for many people an alarming experience—not because the patients are alarming (they so seldom are) but because of the sense of inadequacy that ignorance engenders. Can we doubt that this abrupt introduction to the work was among the chief causes for the loss of 65–70% of student nurses before the end of training, most of them during their first year?

Apart from the lectures they attended in the P.T.S., student nurses were offered, during their first year in hospital, 24 lectures on anatomy and physiology by the medical staff, adequate revision classes (some optional, some compulsory), and 6 lectures on psychology from the sister-tutor. The famous Dr. ARNOLD of Rugby wears in his portrait a puzzled expression, which LYTTON STRACHEY attributed to the failure of his boys to make headway in French despite half an hour's instruction in that language every week. Do the sister-tutors in our mental hospitals acquire a similar look? Or is theirs a look of despair, directed at the medical staff? For a full-dress course of 20 lectures on psychiatry and 20 on neurology, from doctors, student nurses had to wait until their second year—and many of them did not wait. In their third year they got, also from doctors, 10 lectures on normal psychology (surely rather late in the day), and 6 on child psychiatry; and the sister-tutor followed up each of these in a discussion period. Thus in their second and third years the student mental nurses were having a formal educational diet relatively rich in the nutrients they had been needing all along. In some ways, however, it was a feast of Tantalus, for their attendance at lectures often depended on whether or not they could be spared from the wards. Lecture attendance, as a proportion of the possible or ideal, was 56% at Bethlem and 65% at

the Maudsley over four years; and of those nurses who were absent, just under half were away for reasons accepted as unavoidable. Naturally the student also got a good deal of practical and informal training in the wards, and it was in fact the firm intention at both hospitals that some of this should be given by the doctors. Thus there were weekly "ward talks" in which the registrar or senior house-officer spent an hour discussing one or more patients with as many nurses as could be spared from the ward at the time. But unfortunately at busy moments such engagements are liable to be cancelled, and audiences are seldom at full strength: thus at Bethlem, in the year under review, only 53% of the possible number of talks had been given, and student nurses had attended only 32% of those provided for them. Students certainly could not count on hearing an informative discussion on all of the cases which came under their care; and they had little opportunity to ask about them at other times, for the job analysis shows that they spent only 1–2% of their time with doctors—usually in looking for a patient. This need was to some extent met by another means of communication—the "nurses' notes." On the admission of a new patient, the registrar wrote his instructions on a sheet with this heading, and the nurse to whom the patient was assigned wrote on this sheet her observations on the patient's behaviour during the week. The ward sister handed the notes to the registrar weekly, and he added his own notes and comments. Fully used, this is a valuable device; but if (as sometimes) it is neglected the nurse loses interest, and her notes become desultory. Registrars and senior house-officers, on appointment, were given a $2^1/_2$-day induction course, which included a 30-minute talk from the sister-tutor on the part they were expected to play in the training of nurses. But these occasions, too, may have helped to stamp the sister-tutors with a look of Dr. ARNOLD.

The doctors, however, were not entirely to blame if they occasionally displayed only a lukewarm interest in nurse training; for the nursing candidates were of very uneven quality. Actually of those who asked for an application form, 70% never filled it in and sent it back; 40% of those who did send it had to be rejected; and two-thirds of those accepted dropped out, most of them during their first year. Doctors with more urgent things on their minds may well grudge spending teaching time on young people who are never going to make nurses. Nevertheless these things cut both ways: a high rate of wastage is a bad advertisement for mental nursing; and a doctor's casual attitude towards nurse training may lose some promising, as well as some unpromising, students. In the case of a male student nurse already perhaps worried about the financial prospects, it may make the difference between staying and going; and the disappointment of the good and promising nurse who gives up training may deter many other likely candidates.

The survey should encourage mental hospitals elsewhere to consider how far, as employers, they now show themselves skilled in industrial psychology. An application form which puts off 70% of candidates might well need revision; and it can be very unwise to plunge an adolescent student, without due preparation, into an environment which is bound at the outset to seem stressful. If her further experience of hospital life fails to build up her morale—and that pretty quickly—she is naturally going to leave. The report makes the practical suggestion that every student nurse might be attached to a psychiatric firm: this would not only help her to think of herself as part of a team, but might help the doctors, too, to think of her in this way, and to treat her accordingly.

Chelating Agents

TREATMENT of metallic poisoning by chelating agents was introduced a few years ago in the United States by BESSMAN and his colleagues,[1] and many reports have since testified to the value of this method. Earlier this year we published an account of a case of lead poisoning in a child successfully treated by the chelating agent, calcium disodium ethylenediamine tetra-acetic acid (E.D.T.A.)[2]; and on a later page of this issue Professor BROWNE describes two cases in adults.

Chelating agents (χηλή, a claw) combine with certain metals to form firm complexes. They have this property because they contain nitrogen or other atoms capable of donating electrons to metals which require these in order to complete their atomic configuration. The resulting ring structures are very stable, and the metal is non-ionised and thus does not show its usual chemical or physiological activity. Hæmoglobin is a chelated complex containing iron. Chelating agents are useful in medicine because the metal complex formed is soluble, is readily excreted by the kidney, and is non-toxic: the action of a chelating agent in metallic poisoning might be likened to that of a policeman peacefully escorting a trouble-maker from a political gathering. The affinity for the chelating agent varies between the different metals,[3] and one metal which forms a stable complex can displace a second metal whose complex is less stable. This is the basis of the therapeutic use of calcium disodium E.D.T.A. in lead poisoning. The disodium salt itself is unsuitable for the treatment of heavy-metal poisoning, because it very readily combines with calcium,[4] and may thus provoke dangerous hypocalcæmia. But the affinity of lead for E.D.T.A. is greater than that of calcium, so administration of the calcium chelate results in lead being safely removed from the tissues.

Rational therapeutic use of calcium disodium E.D.T.A. requires knowledge of the pharmacology of this agent. It can be given by mouth, since it is absorbed to some extent from the gut without significantly chelating metals present in the alimentary tract[5–7]; but absorption is greater when it is given subcutaneously[8,9] or intravenously. E.D.T.A. is rapidly excreted unchanged in the urine, about 90% of the dose being eliminated within six hours after intravenous injection.[10] At the pH of the body 1 molecule of lead is bound to 1 molecule of E.D.T.A. If the chelating agent were fully efficient in the body

1. Bessman, S. P., Reid, H., Rubin, M. *Med. Ann. D.C.* 1952 **21**, 312.
2. Giles, H. McC., Moore, C. J., Still, B. M. *Lancet*, Jan. 22, 1955, p. 183.
3. Martell, A. E., Calvin, M. The Chemistry of the Metal-chelate Compounds. New York, 1952.
4. Spencer, H., Vankinscott, V., Lewin, I., Laszlo, D. *J. clin. Invest.* 1952, **31**, 1023.
5. Sidbury, J. B., Bynum, J. C., Fetz, L. L. *Proc. Soc. exp. Biol., N.Y.* 1953, **82**, 226.
6. Bradley, J. E., Powell, A. M. *J. Pediat.* 1954, **45**, 297.
7. Cotter, L. H. *J. Amer. med. Ass.* 1954, **155**, 906.
8. Bessman, S. P., Rubin, M., Leikin, S. *Pediatrics*, 1954, **14**, 201.
9. Kneller, L. A., Uhl, H. S. M., Brem, J. *New Engl. J. Med.* 1955, **252**, 338.
10. Foreman, H., Vier, M., Magee, M. *J. biol. Chem.* 1953, **203**, 1045.

1·3 millimols of calcium E.D.T.A., equivalent to 0·5 g., would produce excretion of about 260 mg. of lead. The figure observed by BESSMAN et al.[8] was in fact only 1·8 mg. of lead, representing an efficiency of 0·7%. The probable reason for this low efficiency is that lead is bound in the tissues to sulphydryl groups; and although the affinity of lead for calcium E.D.T.A. is greater than it is for the SH groupings, these are much more numerous in the tissues. BESSMAN et al. found that increasing the dose of calcium E.D.T.A. did not increase the excretion of lead, probably because much of the larger dose is excreted in the urine before it can be brought into equilibrium with the tissues. This would suggest that the best way to give calcium E.D.T.A. in acute lead poisoning is by slow continuous infusion or by repeated infusions; and hitherto the latter method has been the most commonly used. A single dose need not exceed 0·5 g.; this amount is usually given dissolved in about 200 ml. of saline over a period of two hours, and infusions are repeated every eight or twelve hours for about five days. Subsequent courses of similar duration are given, divided by intervals of a few days. Administration of the chelating agent is rapidly followed by a large excretion of lead chelate in the urine, with a daily output of up to 4 mg.; the blood-lead level falls steadily; symptoms of acute lead poisoning are rapidly relieved[11]; and over a period of days coproporphyrin disappears from the urine, the stipple-cell count in the blood falls to zero, the lead-line in the gums disappears, and the dense band at the metaphysis of the long bones of children becomes no longer demonstrable radiographically. The oral preparation is probably best reserved for the treatment of less acute cases.[6] There is evidence that calcium E.D.T.A. can be given safely: the vital elements, iron, copper, and cobalt, do not displace calcium from the calcium E.D.T.A. complex; serum levels of sodium and magnesium are not seriously deranged[7]; and the serum-calcium level itself remains unaffected.[4] The lead E.D.T.A. complex has caused few side-effects.[7]

E.D.T.A. has also been used in the treatment of poisoning due to other heavy metals: for example, MALOOF[12] found that an ointment containing calcium disodium E.D.T.A. is of value against the indolent chrome ulcers seen in the tanning industry. But this agent may have further uses. In laboratory animals it removes radioactive isotopes, such as yttrium[13]—a property that may prove clinically important. In a different approach, an attempt has been made to "chelate" out of the body calcium which has accumulated in pathological processes, such as nephrocalcinosis, otosclerosis, peripheral vascular disease, and calcified mitral stenosis.[14] The theoretical justification for such a measure has not yet been fully worked out; nor is this measure free from hazard. In two cases of hypercalcæmia treated with sodium E.D.T.A. by DUDLEY and his colleagues[15] the patients died; and necropsy revealed severe damage in the proximal convoluted tubules of the kidneys, which DUDLEY et al. believe was probably a result of the therapy.

11. Wade, J. F., Burnum, J. F. *Ann. intern. Med.* 1955, **42**, 251.
12. Maloof, C. C. *Arch. industr. Hlth*, 1955, **11**, 123.
13. Vaughan, J. M., Tutt, M. L. *Lancet*, 1953, ii, 856.
14. Clarke, N. E., Clarke, C. N., Mosher, R. E. *Amer. J. med. Sci.* 1955, **229**, 142.
15. Dudley, H. R., Ritchie, A. C., Schilling, A., Baker, W. H. *New Engl. J. Med.* 1955, **252**, 331.

In E.D.T.A. the physician has acquired a valuable and safe means of treating acute and chronic poisoning by various heavy metals, and a chemical tool which, if used judiciously, may lead to better understanding of many metabolic problems.

Ascites

THE development of ascites in portal cirrhosis of the liver depends on several factors; but the movement of fluid from the capillaries into the peritoneal cavity is controlled primarily by hydrostatic and colloid-osmotic pressures.[1] Tending to force fluid out of the vascular compartment is the capillary blood-pressure, and drawing it out is the osmotic pressure of the proteins in the interstitial and ascitic fluid. An opposing force is exerted by the osmotic pressure of the plasma-proteins, and by the intra-abdominal hydrostatic pressure.

Portal cirrhosis increases the resistance to blood-flow through the liver[2]; and this in turn increases the portal venous pressure, which has been measured directly at operation, by determining the pressure in portal collateral veins as they run up the anterior abdominal wall, and by passing a catheter via the right atrium into a hepatic vein. If the catheter is inserted until it occludes the vein the pressure recorded agrees closely with the portal venous pressure—the technique is analogous to measuring the left atrial pressure by wedging a catheter in a pulmonary arteriole.[3] By this means SHERLOCK and her associates[4] found that the portal venous pressure averaged 7 mm. Hg (range 2·6–11·2) in healthy people and was raised to 22 (range 15·6–35·2) in 11 patients with cirrhosis. By itself increased portal venous pressure does not cause ascites. Ligation of the portal vein in laboratory animals and during removal of the pancreas in man does not produce ascites: in animals ascites follows only if plasmapheresis is carried out in addition,[5] and in patients with extrahepatic portal obstruction ascites develops only when hæmorrhage from œsophageal varices reduces the plasma-protein level; when the proteins are restored to normal the ascites disappears although the portal hypertension persists. Thus a reduction in plasma-proteins as well as portal hypertension is necessary for the formation of ascites, and in cirrhosis hepatic synthesis of plasma-proteins is impaired. POST and PATEK[6] have found fairly close agreement between the plasma-albumin value and the presence or absence of ascites; the critical level being about 3·1 g. albumin per 100 ml., below which ascites is usually present.

In addition to these two main factors others are involved; and, although some workers have sought to show that these are primary, most believe that they operate secondarily to the changes in body-water and electrolytes that follow the accumulation of several litres of additional extracellular fluid. This fluid is derived from the vascular compartment, and unless salt and water are retained the plasma-volume will become seriously reduced. Thus ascites is associated with a pronounced reduction in the urinary

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2. See *Lancet*, 1954, ii, 1316.
3. Hellems, H. K., Haynes, F. W., Dexter, L. *J. appl. Physiol.* 1949, **2**, 24.
4. Paton, A., Reynolds, T. B., Sherlock, S. *Lancet*, 1953, i, 918. Reynolds, T. B., Balfour, D. C., Levinson, D. C., Mikkelsen, W. P., Pattinson, A. C. *J. clin. Invest.* 1955, **34**, 213.
5. Volwiler, W., Grindlay, J. H., Bollman, J. L. *Gastroenterology*, 1950, **14**, 40.
6. Post, J., Patek, A. J. *Arch. intern. Med.* 1942, **69**, 67.

excretion of sodium. Since low sodium excretion is at the same time found in saliva, sweat, and fæces and can be reproduced by administration of deoxycortone, it has been suggested that secretion of a mineralocorticoid hormone by the adrenal cortex increases in response to the threat of plasma-sodium depletion. LUETSCHER and JOHNSON [7] have now confirmed that in cirrhotics with ascites increased amounts of a potent sodium-retaining hormone, aldosterone, are present in the urine. In experimental ascites in the dog removal of the adrenal glands is followed by profound sodium diuresis and disappearance of the peritoneal fluid [8]; and MARSON [9] has reported a similar response in a cirrhotic patient subjected to total adrenalectomy. In addition to aldosterone other adrenocortical steroids may play a part in the conservation of sodium. Although the plasma level of 17-hydroxycorticosteroid compounds is not abnormally raised in cirrhosis, there is good evidence that they are not metabolised at a normal rate by the damaged liver.[10] Thus the proportion of steroid present in the plasma in an active form, rather than as an inactive conjugate, may be greater than normal although the total amount of unconjugated and conjugated hormone may be no greater than in health. Since the plasma-sodium level is not raised in patients with ascites there must be increased retention of water in parallel with the sodium retention. Some workers [11] claim to have demonstrated increased amounts of an antidiuretic substance in the urine of such patients, and have suggested that increased secretion, or decreased destruction, of the posterior-pituitary antidiuretic hormone may have a primary rôle in the pathogenesis of ascites. Unfortunately the techniques for estimating the antidiuretic hormone in urine are imperfect, and in a careful study WHITE et al.[12] have found that cirrhotic patients metabolise antidiuretic hormone at the same rate as healthy people; and other workers with improved techniques have not found that the plasma level of antidiuretic hormone is raised.[13] Diminished renal blood-flow has been reported in some [14] but not all [15] patients with ascites; and it seems likely that this, like increased secretion of aldosterone, is a secondary event depending on reduction in effective plasma volume as a result of movement of fluid from the vascular compartment into the peritoneal cavity. It is wrong to think of ascites as a static collection of fluid separated from the vascular compartment. Studies with radioactive isotopes [16] have shown that within the course of an hour half the ascitic fluid is exchanged with plasma fluid, and albumin given intravenously to raise the plasma osmotic pressure fails to achieve its purpose because the protein passes rapidly into the ascites.[17]

Treatment is aimed at improving liver function, and sometimes in ascites of sudden onset the patient may lose a lot of fluid when put to bed on a well-balanced diet containing 80–100 g. protein. Usually, however, little can be done to improve the state of the liver, and treatment is then directed against sodium retention by restricting the intake of salt to less than 1 g. daily.[18] An initial paracentesis may hasten relief, but repeated paracenteses are to be avoided on account of the large amount of protein lost to the body. If the ascites is not controlled by a low-sodium diet alone, mercurial diuretics and ammonium chloride should be given twice weekly.

Annotations

B.C.G.

THE problems associated with B.C.G. vaccination are increasing. A preliminary assessment of the vaccination programme in India, sponsored by the government of India and carried out by W.H.O.,[19] underlines two important points. First, owing to the high prevalence of non-tuberculous tuberculin sensitivity in certain areas [20] the uninfected cannot be accurately distinguished from the infected. A varying proportion of children who have not been infected by tuberculosis are being excluded from vaccination, the proportion probably being as high as 50% in some areas. Raising the arbitrary limit for a positive reaction would bring in more of these children, but it would also involve vaccination of more of the already infected. Secondly, the degree of skin sensitivity after vaccination was found to vary considerably, and in many instances was much lower than had been expected. It was thought that this could not be due to a racial incapacity of Indian children to develop high sensitivity, or to impairment of the vaccine's potency by exposure to light. Some other factors in its handling or administration must have been involved, or there may have been inaccuracies in the tuberculin-testing. The potency of tuberculin, like that of B.C.G., decreases with exposure to sunlight.[21] Exposure to subtropical sunlight of a 5 T.U. dilution of P.P.D. in clear glass bottles for twelve hours impairs its potency by about 80%.

It is important to know what degree of sensitivity is being produced by vaccination. In vaccinated guineapigs the length of survival after infection by virulent bacilli is related to the size of the post-vaccination tuberculin reaction.[22] As the dose of living B.C.G. is increased, there is not only an increase in the size of the vaccination lesions and the subsequent tuberculin reaction, but also in survival after infection. Heat-killed B.C.G., on the other hand, leads to small reactions and short survivals, although the vaccination lesions are as large as when living B.C.G. is used. The size of the vaccination lesions is clearly not a reliable guide to the immunity induced; but that of the post-vaccination tuberculin reaction may be.

The frequency of suppurative lymphadenitis in the newborn is causing some concern. There are reports of an incidence as high as 23% in Taiwan [23] and of nearly 12% in this country.[24] The frequency of local abscess at the site of injection depends largely on the technique of vaccination; the deeper the injection the greater the risk of an abscess. The presence of suppurating lymph-nodes is apparently unrelated to the severity of the vaccination lesion.[23] On the other hand, it is closely

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11. Hall, C. A., Frame, B., Drill, V. A. *Endocrinology*, 1949, **44**, 76. Sims, J. L. *J. Lab. clin. Med.* 1950, **36**, 990.
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14. Leslie, S. H., Johnston, B., Ralli, E. P. *Ibid.* 1951, **30**, 1200.
15. Goodyer, A. V. N., Reiman, A. S., Lawrason, F. D., Epstein, F. H. *Ibid.* 1950, **29**, 973.
16. Prentice, T. C., Siri, W., Joiner, E. E. *Amer. J. Med.* 1952, **13**, 668. See *Lancet*, 1951, **i**, 584.
17. Patek, A. J., Mankin, H., Colcher, H., Lowell, A., Earle, D. P. *J. clin. Invest.* 1948, **27**, 135.
18. Atkinson M., Paton, A., Sherlock, S. *Lancet*, 1954, **i**, 128.
19. *Bull. Wld Hlth Org.* 1955, **12**, 102.
20. See *Lancet*, March 26, 1955, p. 659.
21. *Bull. Wld Hlth Org.* 1955, **12**, 179.
22. *Ibid*, p. 31.
23. Hsing, C. T. *Ibid*, 1954, **11**, 1023.
24. Gaisford, W., Griffiths, M. *Tubercle*, 1954, **35**, 7.

related to the dose of the vaccine and the age of the child [25]; Gaisford and Griffiths [24] found that the incidence was reduced from 11·7 to 0·3% by lowering the dose of B.C.G. from 0·2 to 0·05 ml. But since the degree of immunity may be directly related to the dose of B.C.G.[32] the dose should be as large as possible.

A much more serious complication of vaccination has been recorded. Meyer [26] reports from Denmark the death of a 9-year-old boy from widespread tuberculosis involving the lymphatic system two years after vaccination. Thirteen cultures of tubercle bacilli were obtained at different times from different lesions before and after death. These were found to be indistinguishable from B.C.G.; no normally virulent bacilli were isolated. The conclusion that the disseminated tuberculosis and death were due to the B.C.G. vaccination is inescapable. A similar case has occurred in Norway.[27–29] A man, aged 24, who had been vaccinated four and a half years previously, died after a protracted illness during which there were tuberculous lesions in the lymph-nodes, bones, lungs, urinary tract, and rectum. Bacilli indistinguishable from B.C.G. were recovered during life and from several organs after death. There is no evidence in either case that the batch of vaccine used was in any way abnormal. There have, of course, been previous reports of deaths attributed to B.C.G.—such as those in Hungary in 1930 [30 31]—but in none has the evidence been completely convincing. It must now be admitted that B.C.G. can cause disseminated progressive disease in man without any apparent change in its properties in the laboratory. But it is also clear that this must happen very rarely indeed. Irvine,[32] in 1949, estimated that if all the suspicious cases were included the incidence was less than 4 per million. Between 1951 and 1953, 16 million were vaccinated in the mass vaccination campaigns of W.H.O. alone [33]; and no deaths have so far been reported.

These two deaths do not by themselves give cause to alter the current practice of B.C.G. vaccination. Indeed there is reason to wish that it were more ready obtainable in this country by doctors who want to use it. At present its import and distribution are closely controlled by the Ministry of Health; and only those belonging to certain specified groups can be vaccinated. Such a cautious policy may be correct if vaccination is regarded as a public-health measure. But B.C.G. vaccination also concerns individuals. Other protective inoculations are uncontrolled, whether or not they are considered by the Ministry to be desirable. The doctor is free to decide whether the patient, for whose health he bears a more direct responsibility than do the public-health authorities, should be inoculated against, for instance, yellow fever: the fact that such inoculation is wholly unnecessary in this country is irrelevant. But he cannot decide whether the patient should have B.C.G. If control were removed it is unlikely that B.C.G. would in fact be used much more extensively than at present. But an important principle would have been upheld.

A NEW MORPHINE ANTAGONIST

Most clinicians have had to face the problem of the patient with intractable pain who needs increasing doses of morphine, which cause severe depression. Shaw and Shulman [34] have given a synthetic morphine antagonist, 2–4 diamino 5 phenyl thiazole, by injection in doses of up to 40 mg. to five patients in the terminal stages of carcinoma. This had the effect of relieving the severe respiratory depression and narcosis induced by the large amounts of morphine which these patients were receiving—up to gr. $1^1/_2$ (24 mg.) in a single dose—without impairing the analgesic action. No disagreeable side-effects were noted. This compound differs from nalorphine in that it does not provoke withdrawal symptoms in patients already receiving morphine.

THE FIRST TEN MINUTES

The notable reduction in infant mortality during late years has been largely due to decreased mortality in the group aged 1–12 months, as has been shown graphically by Dr. Morris and Mr. Heady.[1] Donald [2] contends that many deaths in the first month are preventable. In the past most such deaths were attributed to prematurity, and some progress has been made towards averting premature delivery. (Hamlin's work [3] on the prevention of pre-eclampsia is a notable contribution.) But lately attention has been directed to improving the survival-rate of premature babies, in the belief that prematurity is sometimes inevitable. Potter [4] has laid down a challenge to clinicians by refusing to accept, without close scrutiny, prematurity as a cause of death per se in babies weighing over 1000 g. (2·2 lb.). She states emphatically that the commonest cause of death in premature babies above this weight is hyaline membrane, and though our knowledge of this condition is still imperfect it is probably to some extent preventable and treatable.[5]

If the neonatal survival-rate is to be increased, then methods of resuscitation and of care of the newborn must be improved. One measure which has brought great benefit is the intra-gastric administration of oxygen,[6] which has been widely practised with excellent results. Atlee,[7] urging the need for closer attention to the infant in the first minutes after birth, writes:

> "What seems to happen so often is this: immediately the baby is born its cord is clamped and cut, it is handed to a nurse who puts it in a cot at the far corner of the delivery room, or in one actually outside the delivery room, while the obstetrician proceeds to sew up the episiotomy. Presently someone comes in to say that the baby is either not breathing well or has stopped breathing. After that a nerve-wracking 10 or 15 minutes of resuscitation ensues, until the grey-blue baby responds . . . sometimes it doesn't."

Atlee admonishes us "not to let the baby out of our hands until it is breathing properly and has a good pink colour all over its body." He believes that complete drainage of amniotic fluid from the respiratory tract is essential, and to achieve this he holds the newborn baby upside down for 5 minutes. Gibberd,[8] too, emphasises the importance of complete removal of amniotic fluid. Atlee remarks that the umbilical cord should not be severed until the infant has received all the blood from the placenta. The advantages of this are clear, and are especially great in the case of the premature baby. He also suggests that the cord should be tied with tape, thus averting the risk of cord hæmorrhage associated with clamping. He likes to have beside the delivery bed a light carriage in which the baby is kept under the eye of the obstetrician for the all-important first few minutes. Duckman et al.[9] point out that the baby should lie at a lower level than the mother. Atlee is in fact urging a change of emphasis in the third stage of labour. He suggests that obstetricians have concentrated too closely on the condition of the mother, because of fear of hæmorrhage. Nowadays, with recourse where necessary to ergometrine, the obstetrician should be able to control the third stage without losing sight of the child.

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27. Thrap-Meyer, H. *Acta. tuberc. Scand.* 1954, **29**, 173.
28. Oeding, P., Hesselberg, I. *Ibid*, p. 180.
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30. Gardi, J., Gergely, J., Surang, L. *Gyógyászat*, 1930, **75**, 442.
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3. Hamlin, R. H. J. *Lancet*, 1952, **i**, 64.
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5. See *Lancet*, March 19, 1955, p. 601.
6. Akerren, Y., Fürstenberg, N. *J. Obstet. Gynæc., Brit. Emp.* 1950, **57**, 705.
7. Atlee, H. B. *Canad. med. Ass. J.* 1954, **70**, 227.
8. Gibberd, G. F. Anoxia of the New-born Infant. Oxford, 1953.
9. Duckman, S., et al. *Amer. J. Obstet. Gynec.* 1953, **66**, 1214.

Special Articles

TALK, TACT, AND TREATMENT*

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I AGREE with Dr. Balint that many doctors select the physical and eschew the psychological factors in their patients' illnesses. I know I am as guilty of this as are most physicians. All the same, we have some excuse, some reason, for being frightened or suspicious of the subject of psychiatry even though we know that psychological factors are important.

Psychiatry seems to me to differ from medicine in having a closer resemblance to religion. Beliefs and dogmas are promulgated by certain masters—Freud, Adler, Jung, and so on—and these ideas are believed more from reverence of their originator than from repeated experimental observation. Secondly, the language of psychiatry, like that of religion, is often esoteric and concerns itself with concepts and abstractions whose exact meaning is less precisely comprehended than are the majority of medical concepts. If for a moment we consider the dynamic formulation of both objective and subjective thought fantasy, then cognitive functions can easily become projected into an integrated but psychically barren wish-fulfilment. That last high-sounding sentence, as I hope you noticed, has no meaning whatever and is pure nonsense; but I wrote it to demonstrate that with the aid of abstract terms it is easy to parade such a brave show of words in front of one's thoughts that it is extremely difficult to see if there is any idea behind them, and it is equally easy to take a small idea and wrap around it such a glittering mantle of language that it can dazzle the unwary into applause. Thus although much wisdom is written by psychiatrists, the nature of the subject and its language make it hard for the ordinary doctor to distinguish the profound from the profuse.

Another difference between psychiatry and medicine is that it is easier to prove the correctness or otherwise of medical ideas. Modern medicine consists to a large extent in debunking the ideas erroneously held by others. We used to treat bloodless limbs by warming them—now we cool them; we used to treat bleeding ulcers by starving them—now we feed them. With psychiatric beliefs experimental proof is much harder. I have recently been reading the views of psychiatrists on the syndrome of depersonalisation. Gordon describes the syndrome as a converted representation of hidden or repressed emotional consciousness by special determination. Perhaps he is right, but Schilder stresses the shift of the libido and its partial concentration on a scrutinising tendency. Here I find myself asking how one can tell if a libido has shifted and what means are there of assessing its scrutinising tendency. Sodger says it may be an attempt to escape psychic castration. Perhaps it may, but for a physician the phenomenon of psychic castration is so much harder to understand than is its physical counterpart. Wittels says it is caused by an unusually large number of phantom figures leaving the ego undecided about which figure should be acknowledged as its representative. As a physician I find myself in complete ignorance as to what is a normal healthy number of phantom figures; would five or six, for instance, be considered excessive?

I have made these few comments to show how much at sea the physician feels when he looks at psychiatric theory, and how bewildered he becomes if he considers how to prove which theory is right.

After this rather lame excuse for the physicians' neglect of psychiatry I will get down to the main body of my subject.

THE DOCTOR AS A DRUG

Dr. Balint spoke of the discovery of his seminar that by far the most frequently used drug in general practice was the doctor himself: "it was not only the medicine in the bottle, or the pills in the box, that mattered but the way the doctor gave them." Here I am in strong agreement. In the words of a popular song "It's not what you do, but the way that you do it." Dr. Balint, continuing the analogy of drug and doctor, regrets that textbooks and lecturers teach us the way to use drugs, but not the way to use ourselves. Admittedly the way we deal with our patients, and especially how we talk to them, is about the most important part of our trade; but can it be taught? I doubt it. It can be learnt by experience and to some extent by watching great doctors handling their patients, but it cannot be taught like pharmacology. All the power of tongue and pen, and all the wisdom of textbook and lecture, can never teach a doctor the knowledge of when to probe and when to leave alone, when to chide and when to reassure, when to speak and when to keep silent. They are private mysteries with a different solution for every one of the million permutations of personality involved between a doctor and his patient.

I believe the analogy between drugs and doctors is a false one: there is such a great difference between them. Drugs can be standardised and doctors (thank heaven) cannot. If you give a man a pill there are only two things he can do with it: he can swallow it or he can throw it away. If you give a man explanation or advice there are uncountable ways of giving it and even more ways in which it can be taken. Dr. Balint tilts at the suggestion that common sense and experience will help the doctor know how to prescribe himself (in fact how to talk to his patients) and says the shallowness of this solution is apparent when it is compared with the careful and detailed instructions with which every new drug is introduced. I think here again the analogy of drug and doctor has been extended too far. On the best way to use drugs there is a certain measure of agreement even though individual patients may react differently, but on the best way to speak to patients there is not. There is some agreement on the correct dose of digitalis for a ten-stone woman fibrillating at 120 beats per minute, but far less agreement on the correct type and dose of conversation for a ten-years-unhappily-married woman vociferating at 120 words per minute. Moreover there are only three or four kinds of digitalis, but innumerable kinds of doctor, and even more kinds of unhappy women.

No: the prescribing of ourselves cannot be taught; it is partly instinctive, partly imitative, and partly acquired by experience. I do, however, consider it to be of enormous importance and I propose to say something on the subject of conversation with patients.

TALKING TO THE DOCTOR

Why does the patient want to talk to his doctor?

First there is the natural desire for companionship. Many people simply want a pleasant chat, but instead of going along to the local public-house for a drink of beer and a chat with the landlord they go along to the local hospital for a drink of medicine and a chat with the doctor. The use of a doctor for this purpose is unnecessary, and a pleasant gossip over a cup of tea with fellow

* From an address to the Medical Section of the British Psychological Society, forming a sequel to the chairman's address by Dr. Michael Balint published last week (p.683).

patients is equally satisfying. Indeed one enlightened physician tried the experiment of arranging outpatient sessions where the patients did not see the doctor at all unless they specially asked for him †; this experiment was a great success. Moreover, despite the present high price of tea, a cup of tea is cheaper than a bottle of medicine and far less likely to do any harm.

Another reason why people want to talk to doctors is to get sympathy—they do not want help or advice, they want someone to know how much they are having to bear. A vicar's wife told me once that, much to his distress, parishioners were always wanting to show their ulcerated legs to the vicar. This was done not for spiritual healing, but that he might realise the extent of their sufferings. It is a fact that it is easier to bear a heavy burden if that burden is visible to others. Doctors are told of all sorts of troubles—financial, domestic, or personal—which are beyond their powers to relieve; but all the patient is seeking from them is some remark of the kind: "I don't know how you put up with it all," or "I think it's wonderful the way you manage to carry on." Almost anything can be borne if someone thinks one is wonderful.

Some patients, unlike those I have just mentioned, come for advice. They have problems which are soluble, and they need, not sympathy, but a suggestion as to what is to be done or not to be done. Though it sounds paradoxical to say so, I believe the advice given is often immaterial. The conversation helps the patient to make up his own mind, irrespective of the wisdom of the advice given. Only when he is strongly advised to do A does the average person realise how much wiser it would be to do B.

Other types of patient come not to see what the doctor has to say but already firmly decided on what he will say. They come, not for advice, but to get medical backing for their own views. Whatever the doctor says they will report that he confirmed their opinion. If Mr. Jones says "It's that terrible smell in the factory that's given me this chronic stomach" and the doctor says "I'm sorry to hear that," he will be reported as saying "The doctor said the fumes had poisoned my whole system." Or if Mrs. Jones says "Tommy got St. Vitus dance because they caned him at school" and the doctor says "Hmmm," she then reports this to her friends as "The doctor said he'd never seen such a terrible case, and his nerves'll never be the same after that caning."

In similar fashion those who wish to attribute illnesses to tonsils, air-raids, too much work at school, damp walls, or being dropped as a baby will seek medical support for their opinion. Many of these people deserve our sympathy and understanding. Surely it is infinitely more satisfying for them to rage at a bomb or to impugn a tonsil than to try to accept that some illnesses have no certain cause. Fate is such an insubstantial target for blame compared with a damp wall, a large tonsil, or a bad smell.

When a patient is seeking confirmation for an erroneous belief which does no-one any harm and gives him the comfort of something to blame, it is questionable if much good is done in correcting him; but when he is out for blood, seeking ammunition with which to assail his employers, his doctor, or his hospital, then it is a very different matter. This is an age of compensation; not only out of loyalty to our colleagues should we decline invitations from patients to criticise each other, but for the good of the patients themselves. The psychological harm done to patients by long-continued litigation is even more extensive than the expense and trouble caused to the medical profession.

† Bourne, W. A. *Lancet*, 1950, i, 127.

TALKING TO THE PATIENT

Having described some of the reasons why patients come to talk to doctors, I now consider some of the ways a doctor can talk to his patients. As I have remarked, this is not a subject that can be taught, but it can be discussed, and I will consider it under various headings.

First, *impressiveness*. The impression a doctor makes on his patient is as important as the pharmacological action of the treatment he gives, but a doctor wishing to impress a patient must consider first whether he is benefiting him. It is a good thing to give the patient confidence, but a doctor can pay more attention to the impression he is making on the patient than to the good he is doing him. Not only the way a doctor speaks, but his gestures, his manner and his smile all play their part. There are also accessory aids—a book written by the doctor himself lying carelessly on the desk, the use of a large shiny motor-car and chauffeur, or (less expensive but quite effective) the skilful manipulation of a really thick pair of horn-rimmed glasses. Before using these adjuncts the doctor must consider whether he is trying to comfort himself or the patient. It is a greater medical triumph to leave the patient feeling better, but thinking little of the doctor, than to leave him worse, but deeply impressed.

Secondly, *tolerance*. For a successful doctor-patient relationship the doctor should try to achieve a level of tolerance and placidity nearing that of a saint. He must be free of prejudice and not let the patient or his relatives irritate him. Most of us have some foible, some little thing that rubs us up the wrong way. I knew one children's doctor who could not bear mothers who overdid the word "little" as in the sentence "He draws up his little legs, doctor, and his little face is all screwed up when he passes his little motion." I admit myself to an instinctive antipathy to patients who arrive for consultation chewing toffee or gum and also to patients who call me "Doc." Such prejudices can and should be avoided. The doctor's approach should not be "Do I like this patient?" but "Can I help this patient?" Experience will teach that many irritating mannerisms are caused by shyness and not by any desire to provoke; for instance the patient who remains apparently buried in his newspaper when the doctor arrives at the end of his bed is rarely reading it, he is probably assuming nonchalance because he is nervous.

Thirdly, *lucidity*. Misinterpretation of what the doctor says is so easy for the patient. Many a doctor who has given an explanation on which he prides himself would be disconcerted to learn the retailed version of his carefully chosen words. One lady told me she had taken her boy to hospital where the doctor looked down his throat and told her the ear-drum had grown right into the throat and was hanging out like a sausage. He cut it off and said if he'd been five minutes later the child would have been dead. I often wonder what he really said: I feel it cannot have been very clearly put.

Another example. Last week a woman attending my hospital for her gastric ulcer assured me the house-physician had provided her with a new medicine which consisted of a strong solution of rubber dissolved in orangeade which was designed to fill up the cracks in the ulcer and set. This purpose she told me had been achieved.

Both these patients were deluded but delighted; but harmful misinterpretation of doctors' remarks is even commoner. That is why lucidity is so essential. It is a difficult art to cut one's explanatory coat according to the intellectual cloth provided by the patient, and it must be especially hard for psychiatrists to word their interpretations without ambiguity, because the mind is even harder to explain than the body.

Fourthly, *confidence*. Confidence is an infectious thing—the doctor who possesses it is the doctor who can give it to others. It must be sincere. It is not much use pretending you are sure when you are not—the patient can tell. Confidence is invaluable because if you are certain you are right and if you can convince the patient that you are right then whether you really are right or not often makes very little difference. Yet the doctor should not assume omniscience. I have a notion that doctors do not often enough say "I do not know." It is better to tell a man confidently that you don't know than to tell him unconvincingly that you do. Patients can appreciate sincerity and truthfulness more than some people realise.

Another quality that helps a doctor deal with people well is *unhurriedness*. To give a patient the impression you could spare him an hour and yet to make him satisfied with five minutes is an invaluable gift, and of much more use than spending half an hour with him during every minute of which he is made to feel he is encroaching on your time. I do not know if this special kind of unhurried placidity can be acquired purposely, but it is a most enviable faculty to possess.

WHEN TO SPEAK

I now pass from the question of how to speak to the question of when to speak—in this case I mean when to probe beyond the purely physical side of a patient's illness. Physicians see a large number of patients whose symptoms are purely physically caused and respond completely to physical treatment. These require nothing except a prescription and a word of explanation. Then there are patients whose symptoms, although organically caused, seem to be giving them more distress than is warranted by their severity. Here it is well worth finding out what the patients' private beliefs about their symptoms are. Fear of a more severe disease than the one affecting them is in my experience a common reason for so-called functional symptoms. Many a young woman may complain of mild aches and pains which by themselves hardly worry her enough to be noticed, but because she has known somebody crippled with rheumatoid arthritis these symptoms cause her profound anxiety which itself provokes the symptoms further. Such women rarely mention their fear until it is sought out, but it is well worth seeking. There is often a sigh of relief and magical disappearance of symptoms when the patient is reassured that her fears are groundless. It is also just as common to find a man with unaccountable anxiety from minor symptoms because he has a fear of cancer. Here again the dread of cancer is elicited only by tactful inquiries. I think it is wise to ask all patients if they have any ideas about the cause of their symptoms and also to find out if they have any friend or relative suffering from a disease which they themselves fear. Strangely enough, those who have a dread of a disease seem rarely to be the people who suffer from it; so the proportion of cures by reassurance in this group is high.

Another type of patient where some probing may be rewarding is the hypochondriac—the patient who makes a hobby of doctors and drugs. The woman who keeps a diary not of social functions but of pelvic functions, the woman who instead of taking up canasta takes up her bowels and who patronises the great colonic laundries of Harley Street. If the doctor by his talk and his tact can interest her in the world outside instead of the intestines inside he will have achieved something really worthwhile.

CONCLUSION

The truth about doctor-patient relationships is, I believe, almost impossible to ascertain. We doctors rarely know what our patients think of us and rarely learn what effect our talk, tact, and treatment have had. "He was so enthusiastic I didn't like to offend him" is commonly the attitude of the patient.

Occasionally we get glimpses of the truth when we overhear a conversation on top of a bus or when patients' remarks are relayed to us by a friend (or more likely an enemy); but in the main we remain ignorant, and perhaps it is happier that we do so.

ESTIMATES FOR 1955-56

THE National Health Service estimates[1] for 1955–56 allow for an increase of £24,154,770 in net expenditure on the service (including Civil Defence services) in England, Wales, and Scotland. Gross expenditure is estimated at £537,888,365, compared with £511,737,835 in 1954–55, and appropriations-in-aid at £74,518,110, compared with £72,522,350.

The estimated gross expenditure is distributed as follows:

	£
Hospital, specialist, and ancillary services	345,501,315
General medical, dental, pharmaceutical, and supplementary ophthalmic services	149,474,070
Grants to local health authorities	23,506,000
Training services, &c.	1,686,900
Broadmoor Institution and State mental-deficiency hospitals	1,682,300
Liabilities arising from the establishment of the service	5,102,500
Superannuation	8,906,000
Civil Defence services	1,323,470
Other services	705,810
	£537,888,365

The £345,501,315 estimated expenditure on the hospital services is made up as follows: advances to boards (capital account), £12,300,000; advances to boards (revenue account), £320,000,000; directly administered hospitals, limb-fitting centres, &c., £1,887,315; other expenditure, £11,314,000.

Estimated expenditure under most divisions again shows an increase: the largest is under advances to boards (revenue account) where the increase is £20,516,100 Other increases include £2,312,000 for general medical services (total £61,802,000) and £1,034,000 for general dental services (total £27,537,000). The estimate for Civil Defence services represents a reduction of £700,730 on expenditure in 1954–55.

These estimates make no provision for the hospital building programme announced earlier this year, expenditure on which in England and Wales is expected to amount to £7½ million in 1956–57, and to £10 million in 1957–58.[2]

Net expenditure by the Medical Research Council in 1955–56 is estimated at £2,186,160, compared with £1,974,869 in 1954–55—an increase of £211,291. In the general expenses account estimated gross expenditure of £2,235,184 is made up as follows: administration and central expenses, £95,292; National Institute for Medical Research, £392,053; research units and external scientific staff, £1,340,647; special grants to institutions, &c., £184,242; temporary research grants and training awards, £222,950. Under the building grant account, the cost of new building is shown as £84,000, and the cost of special apparatus as £16,100, making a total of £100,100.

1. Civil Estimates for the year ending March 31, 1956. Class v: Health, Housing, and Local Government. H.M. Stationery Office. 6s.
2. See *Lancet*, Feb. 19, 1955, p. 410.

Before Our Time

JAMES PARKINSON

Born April 11, 1755

James Parkinson, whose *Essay on the Shaking Palsy* appeared in 1817, was born in Hoxton, lived all his life there, and was buried at the parish church of St. Leonard's. The term Parkinson's disease is now used throughout the medical world, and the words "Parkinsonism" and "Parkinsonian" have been added to the English language; but Parkinson himself has been "forgotten by the English and by the world at large."[1]

THE FAMILY

His father, John Parkinson, was a surgeon in practice at Hoxton Square, and he was the eldest of three children. His sister Mary Sedgwick (born Jan. 11, 1763) married John Keys, and his brother (born March 5, 1761) died a young man. He married in St. Leonard's Church, on May 12, 1781, Mary Dale, who is believed to have been the daughter of John Dale, a silk manufacturer, who lived in Charles Square, Hoxton. Six children were born of the marriage.[2]

John Parkinson, father of James, became a diplomate of the Company of Surgeons soon after the surgeons separated from the Company of Barber Surgeons, and in 1775–76 he was anatomical warden under the master, or professor of anatomy. He practised at no. 1, Hoxton Square, for many years until his death. A memorial stone is still visible affixed to the wall of the verger's house in the precincts of St. Leonard's Church, Shoreditch, and the inscription "John Parkinson, surgeon, late of this parish, died 10th January, 1784, aged 59," is still readable, though the epitaph below is undecipherable.

No. 1, Hoxton Square, is a corner house, on the south-west corner of the square, and it was still standing in 1910.

It had three storeys and a basement, with a two-storeyed building behind it, having an entrance on to the side street, and behind this a single-storeyed room that might have served as a shop.[1] Nothing exists today except the old front railings: the house was demolished many years ago, and a factory now occupies the site. Parkinson in his will refers to the contents of his shop, and it is probable that he kept an open shop for the sale of medicines, which would enable him to charge for those he dispensed himself. The house was never owned by the family though they had occupied it for so many years, the owner being a Joshua Jenning. The whole of the square, which was built in the middle of the 18th century, was owned at one time by Israel Wilkes, father of the notorious John Wilkes.

Charles Square and Hoxton Square were the two best residential areas in Hoxton, and the Parkinson family had as neighbours the vicar of St. Leonard's Church, another surgeon, lawyers, tradesmen, and several distinguished Nonconformist divines. Today the only residents are the vicar of St. Leonard's Church and the clergy of St. Monica's Roman Catholic Church. Nearly all the other buildings are furniture factories. Some of the buildings were destroyed in air-raids, but the ancient trees in the centre still flourish and the garden is well kept. Two other buildings in the square in Parkinson's time were the Hoxton Square Coffee House and a Nonconformist meeting-house.

MEDICAL WRITINGS

James Parkinson had an urge to write, and as an apprentice he boldly challenged theories of Dr. Hugh Smith, the younger, who had published a book entitled *Philosophy of Physic* and another entitled *Philosophical Inquiries* in 1780. A tract on these books, though published anonymously, is attributed to Parkinson.

His father was medical assistant to the Royal Humane Society for the New River area, which meant that he was on call for cases of drowning. A report of the society for 1778 records that an honorary medal was presented to James "for the recovery of the body of Brian Maxey," on Oct 28, 1777.

The report of the case, which was written by John Parkinson, the father, states that he and his son were called to a house in Hoxton, where a man had hanged himself. When they arrived at the house they found him pulseless and to all outward appearances dead, but after carrying out the restorative methods recommended by the society—e.g., inflation and deflation of the lungs, friction, &c.—the pulse returned in half an hour, natural breathing in forty minutes, and in ninety minutes his senses returned. The patient "expressed his sorrow for his horrid crime and the greatest gratitude to those who were instrumental in his restoration to his wife and children."

Parkinson was in good company, for Dr. Hawes and Dr. Cogan, instigators of the Royal Humane Society, and the illustrious Dr. J. C. Lettsom, were medical assistants for the Thames between London Bridge and Westminster Bridge.

The society paid two guineas to those attempting resuscitation for two hours, a guinea to the landlord of the public house used as a receiving house, and half a crown to the messenger. A further two guineas was awarded to the medical assistant if the patient recovered. As most of the medical assistants refused payment, medals were awarded to them instead. The medal, which was silver and had the recipient's name engraved on it, was bequeathed in Parkinson's will to his medical son.

Parkinson had had a sound liberal education at a time when most surgeons are said to have been ill-educated. He had an extensive practice, and he early showed that he was a keen observer with unusual clinical acumen. He wrote many articles for medical journals on cases which he met in his practice as well as those he had been called to see as a medical assistant of the Royal Humane Society.

He described the treatment of a child, aged 14 months, who was found lying face downwards in a tub of water; the attempted resuscitation of a youth who had been drowned, and his experiments with an electrical apparatus on the muscles of the limbs; the treatment of a servant girl of 28 who was suffering from hydrophobia, and who afterwards died in the London Hospital; the treatment of two men who were struck by lightning in a house in Shoreditch, both of whom recovered; and the recovery of a farm labourer who had been blinded by a flash of lightning, while driving cattle in from a field on a stormy night. He described a case of trismus, following a compound fracture of the bones of the leg, in which the patient recovered after treatment with heroic doses of tincture of opium and drastic purgation. In a report in 1812 on the post-mortem examination of a boy of 5, he describes a perforated gangrenous appendix with peritonitis, believed to be the earliest reference to the disease in English medical literature.[3]

He also wrote popular books. Today they would have some such titles as "Home Doctor" or "First Aid for the Sick and Injured." But at the turn of the 18th century they were called *Medical Admonitions for Families* (1799), and the *Villager's Friend and Physician* (1800). A first-aid sheet intended to be hung by the cottager's fireside was called *The Way to Health* (1802). He wrote a book for children *Dangerous Sports* (1800), which pointed out the dangers of childish pranks and rough games.

1. Rowntree, L. G. *Bull. Johns Hopk. Hosp.* 1912, **23**, 33.
2. The first child, James John (born Feb. 11, 1783), died in infancy; the second, John William Keys (born July 11, 1785), was apprenticed to his father and became a surgeon; the third was Emma Rook (born April 5, 1788); the fourth, Jane Dale (born Oct. 2, 1789), died Jan. 21, 1792; the fifth, Henry Williams, was born May 7, 1791, and the sixth Mary Dale, was born March 8, 1794. James, his brother and sister, and all his six children, were baptised in St. Leonard's Church.

   John William Keys Parkinson married Diana Chapple, in St. Leonard's Church, on May 7, 1811, and they had two children, James Keys (born Oct. 29, 1812) and Mary Hester (born March 30, 1816). After his wife's death he married again, and his wife, Elizabeth Caroline, bore him a son, John Ellis (born July 29, 1820).

   Emma Rook Parkinson married John Dymock, of Stonehouse, Gloucestershire, on Oct. 29, 1816, at St. Leonard's Church, and they had four children. The eldest, Emma Parkinson Watts Keys Dymock (born November, 1821, died Aug. 28, 1867) married Edward Brown of Croydon. The youngest, the Rev. Nathaniel Dymock, M.A. Oxfd, died in 1909, aged 82, having been rector of Wymonsfold, Kent, and vicar of St. Paul's Church, Maidstone. The other two children died in their teens.

   Henry Williams Parkinson married Elizabeth Ascutt and left the country to live in Calcutta. Mary Dale Parkinson was unmarried at the time of her father's death.

   It is probable that descendants of John Watts Keys Parkinson and Emily Rook Dymock are living today.
3. Shepherd, J. A. *Lancet*, 1954, ii, 299.

Parkinson suffered from gout, as did his father before him, and in his *Observations on the Nature and Cure of Gout* (1805) he described in detail their symptoms and his own theory as to the origin and pathology of gout. But despite the painful enlargements of the interphalangeal joints of his right index finger, he wrote a bold unwavering hand, as may be seen by one of his letters dated 1812, which is in my possession.

In his tract, *Hints for the Improvement of Trusses* (1802), which sold for only a few pence, he pointed out the danger of strangulation and how necessary it was for those doing heavy labour to wear a truss. A plate was included showing the stages in the construction of the appliance which he had designed for the control of inguinal hernia, which could be constructed by any handy man at a small expense. In the preface he deplored the fact that a surgical appliance—a necessity for the preservation of life—could be patented and thus become "a species of monopoly."

Outside his profession he had many interests. His *Chemical Pocket Book* (1799) reached five editions. His main interest and hobby, however, was geology. He had a collecting instinct which grew with the years, and he collected fossils. His monumental work on palæontology, *Organic Remains of a Former World* (1804–11), consisted of three large volumes with plates engraved from drawings which he himself had made. The cost of these volumes was ten guineas, a large sum in those days, but it must have sold well because there are over twenty copies of it in London libraries alone. This work was reprinted twenty-six years after his death by his friend, Dr. Gideon Mantell, another medical man who became a celebrated geologist.

POLITICAL ADVENTURES

Parkinson lived during the French Revolution and the long war with France. He was a pacifist and a political reformer, and he wrote many pamphlets under the pseudonym "Old Hubert," in which he advocated the reform of representation of the people in the House of Commons, the institution of annual Parliaments, and universal suffrage. He became a prominent member of the London Corresponding Society and the Society for Constitutional Information which had these reforms as their aims.

In 1794 the leaders of the societies were arrested and tried for high treason, but were acquitted. Parkinson was subpœnaed as a witness at the trial of Thomas Hardy, the founder of the London Corresponding Society, but was not called to give evidence.

Shortly before the trials of the leaders, three members of the London Corresponding Society, well known to Parkinson, were arrested and imprisoned without trial, the Government having suspended the Habeas Corpus Act in order to do this. They were accused of plotting the assassination of King George III by means of a poisoned dart. The deed was to be perpetrated from the pit of the theatre while the King was sitting in his box. Parkinson, convinced of the innocence of the accused, wrote to the Privy Council offering to give evidence to prove their innocence. The offer was accepted, and in his pamphlet *Assassination of the King* Parkinson set out from memory the questions he was asked and his replies. The supposed plot was a frame-up, based on false evidence concocted by a Government informer who had been a member of the society, and the prisoners were later freed.

The Privy Council were astonished when Parkinson revealed that he was the author of a pamphlet *Revolution without Bloodshed* (1794). His other pamphlets were bitter, sometimes venomous satires, though often mixed with touching pathos. One, in particular, was addressed to Edmund Burke. In his *Reflections on the French Revolution* Burke referred to the common people as "the swinish multitude." Some 40 tracts were published in reply, including one by Parkinson, *An address to the Hon. Edmund Burke from the Swinish Multitude* (1793), in which he wrote:

"As to yourself, good sir, there are those who contend you resemble the venomous asp, whose poison is placed beneath its tongue, or the Camelon, and like that creature, your appearance ever changes with your situation."

SOCIAL REFORMS

The wretchedness of the labouring poor, the poverty and misery of their homes in Hoxton and Shoreditch, had made Parkinson an ardent social reformer.

He had an unfortunate experience.

He was called to see a widow named Mary Daintree, of Rosoman Street, Clerkenwell, who had been wandering about the street at night, had heard voices coming down the chimney accusing her of having killed her husband, and who had concealed a knife in her dress, presumably with suicidal intent. Parkinson saw her after she had been admitted to a private asylum. As a result of his examination he did not think that she was certifiable; so he made inquiries in neighbouring houses, questioned her nephew and niece Mr. and Mrs. Benjamin Elliott, her lodger, and her son aged 16, who said he was convinced that his mother was insane. Parkinson returned to the mad-house, and, as a result of a further examination, signed the certificate for her detention.

After a few weeks she was sitting looking out of the window when she saw a woman friend, to whom she shouted that she was being detained against her will. The friend informed her brother, and other friends, who secured her release. Three years later, Benjamin Elliott was tried at the Clerkenwell sessions house, on an indictment charging him, his wife, and a Sarah Bodkin, with conspiring to deprive Mary Daintree of her liberty. He was found guilty and sentenced to six months' imprisonment.

A storm of criticism of Parkinson's conduct appeared in the daily press. He was accused of certifying Mary Daintree, not as the result of his own observations, but on information supplied by others. Fellows of the Royal College of Physicians, who were visitors in lunacy, expressed surprise that he had not "contradicted the calumnies raised against him." The son, now aged 19, in the witness-box denied that Parkinson had ever questioned him, and Parkinson did not recognise him, though he did afterwards, when it was too late.

In a tract, entitled *Mad-houses. Observations on the Act regulating mad-houses* (1811) he vindicated himself and suggested that two medical certificates ought to be required, instead of one, and that the aid and direction of a justice of the peace was necessary.

In 1819 Parkinson published a tract *Observations on the necessity for Parochial Fever Wards*. He related how in an epidemic of fever among the inhabitants of one of the numerous courts off the Kingsland Road, Shoreditch, they could not obtain the services of hired nurses and neighbours shunned them. He suggested that parochial fever wards should be established, containing 18 beds (6 for men, and 12 for women) for a population of say 50,000 persons. When the epidemic was over the building could be used as an infirmary. Parkinson was visiting physician to the parish infirmary in the Kingsland Road, which was built in 1777, and St. Leonard's Hospital now stands on the site. He deplored the fact that there was only one hospital for pauper fever patients in London, and that its 70 beds were inadequate. It was over fifty years before an Act forced local authorities to provide isolation accommodation for fever cases.

Fully occupied as he must have been with his medical practice, and despite his devotion of his leisure hours to his favourite science, he found time to interest himself in the affairs of the parish of St. Leonard. In 1799 he was elected by his fellow-parishioners a trustee for the liberty of Hoxton, and he remained a member of the vestry until he died.

The committee which managed the Sunday school, held at St. Leonard's Church, appointed him as secretary. In 1807, Mr. Samuel Whitbread, M.P., the brewer, brought a Bill before the House of Commons to establish schools in every parish throughout the country, for the education of poor children, whereby each child should have the opportunity of attending school for two years at the expense of the State. Parkinson wrote a tract *Observa-*

tions on Mr. Whitbread's Plan for the Education of the Poor (1807), in which he said that a debt of gratitude was due to the proposer of the Bill, but he feared that as a result of the establishment of these parochial day schools the Sunday schools would suffer. He maintained "that a mere literary education without the inculcation of moral and religious principles would prove highly injurious." Furthermore, the parents, whose children earned one to three shillings per week up to the age of 14, and five shillings per week after this age, were unlikely to forego this money for the sake of the children's education.

Much concerned with the welfare of the children of the Sunday school, he kept a register containing the names of all children who were seeking employment, with particulars concerning their abilities, behaviour, &c., which was open to inspection by prospective employers, because he felt that the welfare of poor children was greatly influenced by their first situations in employment.

He was also concerned for the welfare of pauper children of the parish, who were apprenticed to masters and mistresses, not in their own parish, but in neighbouring parishes, lest they should become chargeable in adult life. He reflected that no law existed by which the duties of the employer were defined, nor were any inspectors appointed to visit the children to see the conditions under which they worked. He succeeded in persuading the vestry to appoint some of the trustees as voluntary visitors. Later, visitation by paid inspectors was laid down by Act of Parliament.

About this time, Malthus maintained that the earth would not be able to yield enough food to feed the rapidly increasing population. Parkinson thought otherwise, and said "that if the population exceeded the means of support, the fault lay not in nature, but in the ability of politicians to discover some latent defect in the laws respecting the division and appropriation of property."

PARKINSON'S DISEASE

In 1817 he wrote the *Essay on the Shaking Palsy*, which has brought him posthumous fame in the medical world. His description of the disease, which now bears his name, has never been bettered, though it has been expanded. He considered the cause to be principally "in the medulla spinalis of the cervical region, its membranes, or the containing theca," and he hoped that some doctor would one day have the opportunity of examining the body of a patient who had died from the disease—for he modestly apologised for the hypothetical nature of his observations on its pathology. The following extract from the essay is an example of his pleasing literary style.

"The patient experiences much inconvenience, which unhappily is found daily to increase. The submission of the limbs to the direction of the will can hardly ever be obtained in the performance of the most ordinary offices of life. The fingers cannot be disposed of in the proposed directions, and applied with certainty to any proposed point. As time and the disease proceed, difficulties increase; writing can now be hardly at all accomplished, and reading, from the tremulous motion, is accomplished with some difficulty. Whilst at meals the fork, not being duly directed, frequently fails to raise the morsel from the plate; which, when seized, is with much difficulty conveyed to the mouth. At this period the patient seldom experiences a suspension of the agitation of the limbs. Commencing, for instance, in one arm, the wearisome agitation is borne until beyond sufferance, when, by suddenly changing the posture, it is for a time stopped in that limb, to commence, generally, in less than a minute in one of the legs, or in the arm of the other side. Harassed by this tormenting round, the patient has recourse to walking, a mode of exercise to which the sufferers from this malady, are in general partial; owing to their attention being thereby somewhat diverted from their unpleasant feelings, by the care and exertion required to ensure its safe performance."

LAST YEARS

It has been said that Parkinson received no honour for recognising the disease as a clinical entity, nor for his work on palæontology. True, he was given no honorary degree, nor was he elected to the fellowship of the Royal Society; but he did receive recognition from the Royal College of Surgeons of England, whose honorary gold medal was awarded him in 1822. He was, indeed, the first to receive this award (instituted twenty years before), and it has been bestowed only fifteen times in the past hundred and fifty years, the recipients including Lord Lister, Sir James Paget, and Richard Owen.

It seems clear, too, that Parkinson was held in high esteem by his fellow general practitioners, for in 1818 he was chairman of the Association of Apothecaries and Surgeon Apothecaries of England and Wales. He was also a member of many learned medical and geological societies. He was one of eleven people who met at the Freemason's Tavern, Great Queen Street, in 1807, and founded the Geological Society of London, and he was on the council from 1813 to 1815. He was a member of the Wernerian Society of Edinburgh and the Cæsarean Society of Moscow. He was a fellow of the Medical Society of London, and a member of the London Medical and Chirurgical Society.

Parkinson is believed to have retired when he exchanged houses with his son, who continued the family practice in Hoxton Square. He died on Dec. 21, 1824, at no. 3, Pleasant Row, Hoxton, and an entry in the burials register of St. Leonard's Church reads: "No. 741. James Parkinson, Kingsland Road, buried December 29th 1824, R. Crosby." His remains were interred in the graveyard attached to the church, but no tombstone can now be found.

No portrait of Parkinson is known to exist, and the only description we have of him is by his friend Mantell who wrote: "Mr. Parkinson was rather below middle stature, with an energetic, intelligent, and pleasing expression of countenance, and of mild and courteous manners; readily imparting information either on his favourite science or on professional subjects."

Parkinson was truly a general medical practitioner; and his impact on his own generation and his influence on succeeding generations is shown by the number of his ideas, both social and scientific, that are now generally accepted.

My thanks are due to Dr. W. McMenemey, Dr. J. Dymock, and Mr. Jackson, borough librarian at Shoreditch for their assistance in obtaining biographical details.

A. D. MORRIS
M.D. Brux., M.B. Lond.

Points of View

HOLES, KNOBS, AND WIRES

Abstract Art and Auto-suggestion

Sir HENRY TURNER, C.B.E.

THE public is in these days learning in some degree to tolerate persons who act abnormally. We try to persuade ourselves that they are sometimes, in effect, being pushed from behind, and not just "bloody-minded." And I think that we ought to use this charitable approach in considering why artists—many of them possessing unquestionably skilful technique—produce what are at first sight (and often later) meaningless doodles; lumps of stone pierced by quite unsuggestive holes, tangles of wire, and so forth.

So, with a layman's proper timidity I shall attempt an answer to the questions—"Why is abstract art produced, and why is it taken seriously by people seemingly well qualified to appraise it?"

* * *

In the first place I would suggest this experiment. Take three (or more) upholsterer's coiled springs, entangle them, and mount the result in an inverted aquarium bowl indirectly lit, with a professionally

lettered card reading (for example) *Time Passing*. This should be exhibited in a place of some importance. Failing the Tate, a Bond-street art-dealer's window will do.

The reactions of observers will fall into four categories:

(*a*) Confident, extravert derision.

(*b*) Open disconcertment. "I suppose I ought to see something in it."

(*c*) Insincere praise, to dodge a charge of artistic insensitivity.

(*d*) Prolonged study, and a true statement of pleasure in a new æsthetic experience.

There is no reason to trouble about (*a*). They are happy enough, even though scorned by the others. But something can, I think, be done about the uncomfortable inferiority feeling of (*b*), and the unpleasant, self-damaging deceitfulness of (*c*). The remedy seems to lie in an understanding of the auto-hypnotic process employed by class (*d*), who are the prime instigators of the confusion.

The proposition which I would like considered by better qualified readers is that the key to understanding both the origin and the appreciation of abstract art lies in the mechanism of auto-hypnosis. By this mechanism the observer persuades himself that the object possesses in itself a quality affording æsthetic pleasure.

In the experiment I have recommended, all the apparatus is present for producing, first, a light hypnoidal state, and, second, a post-hypnotic effect. There is the steady gaze; the illumination casting surrounding objects into relative gloom; respect, tinged perhaps with awe, for the creator of the intriguing Thing; a pretty strong initial conviction that the Thing has profound significance; and not merely a hope, but an expectation of satisfaction through artistic achievement. The effect of all this, upon a hypnotically susceptible person, is to turn on, so to speak, the switch marked Æsthetic Thrill.

From this it seems to follow that literally *any* object can be used as an emotional trigger by class (*d*), supposing the right circumstances. They self-induce emotion, and then use that emotion as proof that something tangible exists as its rational cause. The people who can perform this pleasurable mental antic could equally well, presumably, produce religious exaltation, quickened body-healing power, and all the other phenomena which result from successful auto- (or hetero-) suggestion. It would be interesting to know whether all those who can achieve admiration for abstract art are in fact "good" subjects for post-hypnotic suggestion in general.

My hypothesis gains some corroboration from the fact that the phases of successive cults of purely abstract art are briefer than those depending on more direct appeal—i.e., the straight, representational, associative styles. The relatively short lives of Dadaism and Cubism may be due to their dependence on auto-hypnosis. Hypnotic suggestions do, I believe, tend to wear out; they wear out too soon for them to be widely transmitted, by training, from one generation to another. Surrealism seems to be lasting better, because it uses recognisable objects which, although irrationally juxtaposed, do provide some ordinary associative prompting.

While I have provided (to my own satisfaction) a rational explanation of artistic admiration of meaningless objects, I have not dealt with the abstract artist himself. But I suggest that my theory covers him too. All creative artists (I think it is agreed) achieve abnormally close contact with their unconscious mental mechanism. They induce this by the age-old processes of muscular relaxation, immobility, and disregard of environment, and sometimes by means of alcohol or drugs. They are people who seek, with profound and reckless desire, a higher allegiance and transcendence of personal identity, and they seem to have something in common with the Buddhist and other contemplative religious orders; perhaps even the Christian Scientists, whose writings are almost totally without meaning to those insusceptible to suggestion.

* * *

So my conclusion is that no-one need be disgusted by his incompetence in sharing the enthusiasm of lovers of abstract art, of jazz music, or "stream of consciousness" prose. Nor indeed, of those people who use a fishing-float to induce a light trance state for escape from their horrid homes. These are all ways of escape from more or less distressing reality. We are the lucky ones if we have no need for such refuges.

Public Health

COWPOX IN MAN

And its Relationship with Milker's Nodules

BERNARD LAURANCE
M.B. Lond., M.R.C.P., D.C.H.

CONSULTANT PÆDIATRICIAN, DERBY CITY HOSPITAL AND DERBYSHIRE HOSPITAL FOR SICK CHILDREN; LATELY SENIOR REGISTRAR, BRISTOL ROYAL HOSPITAL FOR SICK CHILDREN

PROPHYLACTIC inoculation against smallpox (variola) with fluid from a vesicle or pustule of a patient with the disease is known to have been practised for many centuries in various parts of the world. In ancient China dried crusts from a smallpox pustule were inserted into the nostril on "a lucky day"—a practice known as "sowing the smallpox." This is a fine example of the successful empiricism of some ancient Chinese medicine, for we now know that variola virus can survive for over a year in dried crusts and floor dust (Downie and Dumbell 1947).

Variolation was introduced into England at the end of the 17th century. Before then many travellers had brought back news of this form of inoculation, but Dr. Martin Lister was probably the first to communicate the method to the medical profession in this country. In 1695 he published a tract on smallpox that resulted in correspondence between the secretary of the Royal Society and many physicians from abroad. This possibly led to the famous letter written in 1713, and read by Dr. John Woodward to the society in 1714, in which Dr. Timoni of Constantinople advocated the introduction of inoculation into Great Britain (Stearns 1950). There is some evidence that the method was practised before this time in South Wales (Shrewsbury 1951).

For the adoption of the practice in this country Lady Mary Wortley Montagu, the wife of the British Ambassador to the Ottoman Court, was chiefly responsible. She was impressed by the methods she had seen practised in Turkey to lessen the dreaded peril of smallpox, and wrote to her friends in England of her experiences. The following is an extract from a letter written in 1717:

"Apropos of distempers, I am going to tell you a thing that I am sure will make you wish yourself here. The smallpox, so fatal, and so general amongst us, is here entirely harmless by the invention of *ingrafting*, which is the term they give it. There is a set of old women who make it their business to perform the operation every autumn, in the month of September, when the great heat is abated. People send to one another to know if any of their family has a mind to have the smallpox; they make parties for this purpose, and when they are met (commonly fifteen or sixteen together), the old woman comes with a nutshell full of the matter of the best sort of smallpox, and asks what veins you please to have opened. She immediately rips open that you offer to her with a large needle (which gives you no more pain than a common scratch) and puts into the vein as much venom as can lie upon the head of her needle, and after binds up the little wound with a hollow bit of shell; and in this manner opens four or five veins . . . The French Ambassador says pleasantly, that they take the smallpox here by way of diversion, as they take the waters in other countries."

By 1721 Lady Mary had returned to England and, largely by persuading the Princess of Wales to have her children inoculated against smallpox in the Turkish

manner, established the method in this country. It eventually fell into disrepute because of the deaths which occasionally resulted, and also because of the severity of the inoculated disease; consequently in 1840 it was declared illegal.

Many different persons have been said to have discovered the value of inoculation with cowpox in prophylaxis against smallpox. In the minutes of a meeting of the Vaccine-Pock Institution, held in 1805, there is a note that Benjamin Jesty had inoculated his wife and children with cowpox in 1774 (personal communication to Prof. A. V. Neale from Mr. E. Jesty, a descendant of Benjamin). The fact remains that it was Edward Jenner who recognised that cowpox could be transmitted artificially from one person to another and foresaw its prophylactic value.

Jenner had observed that horses were subject to a disease characterised by an eruptive condition of the pasterns and known to farriers of that time as "the grease." Nowadays "the grease" refers specifically to a chronic dermatitis of the legs, seen particularly in cart-horses, working on heavy land, whose grooming is neglected; but in Jenner's time the term referred to an inflammatory swelling of the heel, presumably including vesicular lesions, from which issued "matter of a very peculiar kind": usually the disease could be transmitted via cows to man.

Jenner considered that this disease resembled smallpox. He noticed that if a man dressed a horse suffering from "the grease" and then milked cows, the teats of the cows developed pustules; and the infection was sometimes transmitted to dairymaids—who subsequently became immune from smallpox. (This immunity had probably been suspected earlier by others: the nursery-rhyme "Where are you going to, my pretty maid?" for example, doubtless refers to the dairymaid's pox-free complexion.) Consequently, on May 14, 1796, Jenner inoculated a boy, James Phipps, with matter from a typical cowpox lesion on a dairymaid's finger; subsequent inoculation of this boy with matter from a smallpox lesion was unsuccessful.

Later Jenner realised that if "the grease" was transmitted to human beings direct from horses, without passing through the cow phase, these patients would still be immune to cowpox; indeed, cowpox and horsepox ("the grease") are now known to be the same disease (Hagan and Bruner 1951), or closely related. In 1798 he published his work resulting from this initial experiment in a book entitled *An Inquiry into the Causes and Effects of the Variolæ Vaccinæ, a disease discovered in some of the Western Counties of England, particularly* Gloucestershire, *and known by the name of the Cow Pox.*

It is appropriate that the following description of a small outbreak of cowpox should come from a part of Gloucestershire only seventeen miles from Berkeley, Jenner's home in Gloucestershire.

Clinical Account

The outbreak took place on a small farm some five miles from Bristol. A herd of eighteen cows, to which there had been no recent addition, was kept. About Dec. 1, 1953, the farmer noticed that some of the herd were generally upset and irritable, and that at milking-time they kicked more than usual. Their yield of milk diminished for about ten days and hand milking, which was practised, became even more difficult when the teats swelled and vesicles appeared on their surface (fig. 1). These vesicles later ulcerated (fig. 2) producing an obnoxious smell that only a Gloucestershire farmer's colourful dialect could describe. In his second book—*Further observations on Variolæ Vaccinæ* (1799)—Jenner mentions a doctor friend's report that the cows "gave off an offensive stench from their udders," though he considered this odour unusual among cows affected by cowpox.

Fig. 1—Vesicles on cow's teat.

Fig. 2—Ulcers on cow's teat.

On Dec. 3 the farmer, aged 32, and never vaccinated previously, noticed a pimple on the dorsum of his right thumb; subsequently it became a vesicle, and scabbed over one week later (fig. 3). During this week a pimple also appeared on the right index finger, but rapidly disappeared. At the same time there was headache, lassitude, fever, and lymphangitis, with axillary and epitrochlear lymphadenitis of the right arm. He had to work throughout this illness, and on Dec. 19 he felt worse, and the scab on the thumb was larger (fig. 4). Two days later the scab separated, together with some pus which had probably formed as the result of secondary infection. He then recovered and the thumb healed, leaving a small scar.

The only other persons living on the farm were the farmer's wife, his daughter, and a cowman, all of whom had been vaccinated in infancy, and were unaffected by the cowpox. No other outbreak was reported in either cows or man in the neighbourhood.

Virology

Dr. J. A. Dudgeon, of St. George's Hospital Medical School, kindly investigated serum from the farmer which was taken on the ninth and eighteenth days of the disease. Unfortunately, no vesicle fluid could be obtained, for the lesion had scabbed over by the time it was first seen. There was a distinct rise in complement-fixing antibody to the viruses of both vaccinia and cowpox:

Specimen of serum	*Cowpox virus*	*Vaccinia virus*
9th day of disease	1 : 10	1 : 5
18th day of disease	1 : 160	1 : 320

These viruses are generally held in this country to be distinct, though closely related, the virus of vaccinia being a laboratory strain the precise origin of which is not clear.

Fig. 3—Farmer's thumb one week after appearance of vesicle.

Fig. 4—Farmer's thumb about fifteen days after appearance of vesicle.

Discussion

Recent medical literature includes few references to cowpox in man. Possibly the disease is thought not worth recording, particularly in view of adequate earlier accounts; certainly it became less common after the introduction of vaccination, but with the declining popularity of vaccination it may be seen more often. According to local veterinary practitioners the disease is still fairly common among cows in the West Country, but is rare in horses.

Most veterinary authorities distinguish vaccinia of cows from cowpox of cows. Cow vaccinia originates in man, whereas cowpox is a specific disease of cows, independent of infection from human sources, though giving rise to cowpox in man (Davies et al. 1938). Nomland and McKee (1952), however, consider that genuine cowpox in cows arises from contact with recently vaccinated persons. Cows are usually ill, and their yield of milk decreases, when they have cowpox; they recover in a few weeks. When human beings contract the disease from cows, they develop headache, malaise, and fever, and lesions typical of vaccinia appear.

Such a description accords well with the outbreak reported here, though no recently vaccinated person is known to have been in contact with the cows for a considerable time before the outbreak. The rise of antibody titres to both cowpox and vaccinia confirms the diagnosis of cowpox in the farmer.

Cowpox in man needs to be distinguished from "milkers' nodules."

Bonnevie (1937) gives an account of "milkers' nodules," which he terms "milkers' warts," ascribing this disorder to a virus allied to that of vaccinia. Characteristically, nodular lesions appear on the teats of the cattle, but do not upset them constitutionally. The nodules give rise to painless, bluish-red, indolent nodes on the hands, arms, and face of milkers. Usually there are no constitutional symptoms, though axillary adenitis is sometimes present. The incubation period is eight to ten days, and the lesions heal after six to ten weeks, without scarring, unless there has been secondary infection. Vaccination against smallpox does not prevent the nodules from appearing (Davies et al. 1938, Danbolt 1949, Nomland and McKee 1952).

Clinically, genuine cowpox or vaccinia is easily distinguished from false cowpox or milkers' nodules. The cowpox virus was identified many years ago, but that of milkers' nodules has eluded many investigators. The evidence seems to point to its being allied to, but distinct from, the cowpox virus; the infection has often been termed paravaccinia of Lipschutz (Morozov 1940, Becker 1940). Lately, Findlay and Haig (1952) claim to have isolated the virus.

In Jenner's original monograph the two conditions were clearly distinguished, for he wrote:

"It is necessary to observe that pustulous sores frequently appear spontaneously on the nipples of Cows, and instances have occurred, though very rarely, of the hands of servants employed in milking being affected with sores in consequence, and even of their feeling an indisposition from absorption.

"These pustules are of a much milder nature than those which arise from that contagion which constitutes the true Cow Pox. They are always free from the bluish or livid tint so conspicuous in the pustules in that disease. No erysipelas attends them, nor do they shew any phagedenic disposition as in the other case, but quickly terminate in a scab without creating any apparent disorder in the cow. This complaint appears at various seasons of the year, but most commonly in the Spring, when the Cows are first taken from their winter food and fed with grass. It is very apt to appear also when they are suckling their young.

"But this disease is not to be considered as similar in any respect to that of which I am treating (i.e., cowpox), as it is incapable of producing any specific effects on the human constitution.

"However, it is of the greatest consequence to point it out here, lest the want of discrimination should occasion an idea of security from the infection of the smallpox, which might prove delusive."

I wish to thank Dr. E. P. K. Rushton, of Pilning, Gloucestershire, for informing me about the farmer in the first instance. Prof. F. Blakemore, of the University of Bristol, kindly gave me help on the veterinary aspects of this paper. The photographs were taken by the department of clinical photography, University of Bristol.

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Medicine and the Law

The Overturned Inhaler

A 9-year-old girl was under treatment in a children's hospital following poliomyelitis; she could not move her legs, had to be propped up to sit, and had only a limited use of fingers and arms. When she developed some bronchial trouble, the nursing staff, after various experiments, devised a method of enabling her to use an inhaler herself: they propped her up in bed, put a pillow on her lap, and placed the padded inhaler bottle in a deep tray on the pillow. The child was then able to put her hands round the inhaler and reach the spout. At first she did it with someone standing over her, but later she managed it herself while the nurse in the ward went on with other duties. This worked successfully for two months.

At 6.30 one morning the night nurse, who had sixteen children and two wards to attend to, woke the child and gave her the inhaler in the usual way. The nurse then had to go to the sluice about ten paces down the corridor. While she was out of the ward, she heard cries and came back to find that the inhaler had somehow been tipped over and its scalding contents had soaked through to the child's legs and thighs, causing second-degree burns. The child by her mother brought an action for negligence against the group hospital management committee.[1] Mr. Justice McNair held that neither the nurse nor the administration had been negligent. The plaintiff appealed.

In the Court of Appeal on March 28 Lord Justice Denning said that the court agreed with the judge that the positioning of the child and the inhaler were the best that could be devised, and that the defendants were not negligent on that point. The more difficult question was whether this little girl, helpless as she was, ought to have been left alone at all while using an inhaler containing boiling water. To answer it the court had to consider the situation both of the nurse and of the hospital system.

The nurse was dealing with the other little girls. She had to be near at hand in case of difficulty; and she had been near at hand all the time in the very ward, except for the few moments or seconds when she went to the sluice. Was that negligence on her part to leave the room for that very short while? It might have been negligence in the early stages before it had been seen that the little girl could manage the inhaler. But the judge was right in holding that, after she had managed it quite well for two months, it could not be negligence on the part of the nurse, who had all these children under her care, to leave the ward for that very short time.

1. See *Lancet*, 1954, ii, 1332.

Was the administration then to blame for not having arranged for the inhalations to be done at a time when the nurse was not so rushed, or for not telling her that if she was called out of the room she should put the tray aside? The court could not consider those matters, for they had not been investigated before the judge. One had to be careful in these cases not to be wise after the event. Hospitals and nurses had the whole round of daily duties to attend to, and, with all the skill and care that could reasonably be expected of them, misadventures did occur. This was such a misadventure, as the judge had found, though it was one which might perhaps help to prevent others in future.

Lord Justice Parker and Mr. Justice Roxburgh agreed, and the appeal was dismissed.

Alleged Libel by Doctor

A man sued a limited company for damages for personal injuries sustained in a road accident, and the company's solicitors instructed a doctor to examine him. After doing so, the doctor made a report to the solicitors, who quoted part of it in a letter to the patient's solicitors, as follows:

"I then asked him what he would do if I recommended him to go back to work at once; he replied that he would do, but that he would need three secretaries, a chauffeur and sundry other bodies to do the work he formerly carried out single-handed because he would be unable to do the work himself. I then asked him how long he thought it would be before he recovered, and he stated that he could wait 50 or 60 years if necessary.

"His demeanour during this interview was almost a caricature—lying in bed smoking a cigar in his private single room, the picture of comfort with his radio and photographs. He was cocksure, arrogant and self-opinionated."

The patient saw this letter, and started proceedings against the doctor for damages for alleged libel. The doctor in his defence claimed, inter alia, that the report was privileged. The plaintiff in reply alleged malice.

Mr. Justice Donovan, on an application by the plaintiff, refused to make an order that the plaintiff should be allowed to see and inspect the whole of the report and other documents passing between the doctor and the company's solicitors. The plaintiff appealed.

In the Court of Appeal on March 30 Lord Justice Singleton (dissenting) said that the purpose of this branch of the law of privilege was to enable a litigant or a party to impending litigation to prepare his case. Statements had to be taken and reports obtained. Prima facie, they were the subject-matter of privilege. The privilege was that of the litigant, but it inured for the benefit of the one who had made the report. A statement so given should, generally speaking, be regarded for this purpose in the same light as if it were given in court. To make an order of the kind suggested would be a departure from the recognised practice and would have the effect of deterring potential witnesses from giving statements to solicitors whose clients were concerned in litigation. He would dismiss the appeal.

Lord Justice Hodson said that the claim to privilege was based on "legal professional privilege." The privilege was that of the litigant and not of his witnesses as such. For the purposes of this application, the doctor must be looked at as a proposed witness on behalf of the company. In that capacity not only had he no privilege of his own but he was under no duty to assert the right of the company. He, his Lordship, would allow the appeal, subject to the concession by the plaintiff that the order for inspection was to take effect only when the action against the company for personal injuries was disposed of.

Lord Justice Romer agreed that the appeal should be allowed. Leave to appeal to the House of Lords was granted.

Negligence Claim Dismissed

In an action in which an orthopædic surgeon claimed a fee of £48 6s. for treating a woman patient's broken ankle, judgment and costs were given to the surgeon. A counter-claim by the patient for damages for alleged negligence was dismissed.[1]

The patient, by profession a teacher of dancing, alleged that a month after setting her ankle in plaster the surgeon had forced her to walk upon it in his surgery; he had removed the plaster and manipulated her foot, causing her great pain. The surgeon said in evidence that the fracture had been a severe one, and permanent disability would have resulted whatever the treatment. He had heard nothing of the allegations against him until five years after the injury.

Giving judgment, the judge said that he was unable to accept the patient's story. He was satisfied that there had been nothing in the surgeon's conduct with which he should reproach himself.

Injury to Hæmophiliac

How far should a person be liable for the consequences of his own negligence? Should he be liable only for what might be called the "normal" consequences or should his liability extend further? A hæmophiliac, who suffered injuries which to a normal person would have been comparatively trivial, has been awarded £3000 agreed damages and costs in the High Court.[2]

The plaintiff, a 35-year-old man, said that he had suffered all his life from hæmophilia and had been in hospital over two hundred times. While driving his van in the Old Kent Road, London, in July, 1953, he was involved in a collision with an ambulance belonging to the London County Council. The accident caused bleeding into the hip and knee joints and made him a good deal worse than before. Judgment was entered against the London County Council and the ambulance driver.

The cases on remoteness of damage are not easy to reconcile; but it seems clear that, where negligence is established, the defendant is liable for all the direct physical consequences of his unlawful act. Liability is therefore not limited in such cases to the normal consequences. The award of £3000 damages in the present case appears to be in line with that principle.

Parliament

Transfer of Functions of the Ministry of Food

IN the House of Commons on March 28, Mr. HARRY CROOKSHANK, Lord Privy Seal, explained that it was now proposed by order to merge the Ministry of Agriculture and Fisheries and the Ministry of Food. The interest of the Ministry in the food and drugs legislation would in a subsequent order be allocated to the Minister of Health, who would have the primary responsibility for hygiene problems. The new Minister of Agriculture, Fisheries, and Food would deal with the regulations about the composition of food to safeguard health and to prevent fraud and the regulations about food-labelling.

Mr. ARTHUR BLENKINSOP was uneasy that matters dealing with the composition of food to safeguard health should not go to the Ministry of Health. He asked for a better explanation of the Government's intentions. Mr. HEATHCOAT AMORY, Minister of Agriculture and Fisheries and Minister of Food, assured the House that the second order would be brought forward as soon as possible. The intention was that the primary responsibility for cleanliness and hygiene should go to the Ministry of Health with one exception. The primary responsibility for slaughterhouses, meat, and milk and dairies regulations would more conveniently remain with the new Department of Agriculture, Fisheries, and Food. But of course in all these matters regulations would have to be made jointly and there would be the closest consultation. Primary responsibility for the new Food Hygiene Advisory Council, it was intended, should go to the Ministry of Health.

1. *Manchester Guardian*, March 29, 1955.
2. *Ibid*, March 22, 1954.

QUESTION TIME

Nuclear Radiation

Replying to a question, Sir WINSTON CHURCHILL, the Prime Minister, said that the Government had already invited the Medical Research Council to review the existing scientific information on the medical aspects of nuclear radiation and to prepare a report. The report would cover the medical aspects of nuclear radiation, including the genetic aspects. It would be published as a white-paper.

Mr. ERIC FLETCHER asked the parliamentary secretary to the Ministry of Works, as representing the Lord President of the Council, what progress had been made in the investigations concerning the genetic effects of increased radioactivity due to the explosion of nuclear weapons; and when he expected that it would be possible to begin research on measures designed to counteract these effects—Mr. J. R. BEVINS replied: Research on the genetic effects of radioactivity is necessarily of a long-term nature, but a certain amount of progress has been made and results are published in the scientific press as they become available. The Medical Research Council's programme has, for the past eight years, included work on means of protection against the effects of radiation.

Mr. FLETCHER: Does the Minister realise that the public are becoming increasingly concerned to know what British scientists feel about the precise effect on the future of the human race of these nuclear explosions, are anxious to have full information in a convenient form, and are also anxious that the Minister's department should be able to assure them that some research is being conducted into what counter-measures can be taken?—Mr. BEVINS: The urgency of the work is well appreciated, and it is, of course, going forward on an expanding scale. However, I am bound to say that none of the radioprotectors or regenerators that have so far been discovered have any effect on genetic damage to animals or human beings.

Protection of Hospital Workers

Replying to a question, Miss PATRICIA HORNSBY-SMITH said that it was the normal practice of hospitals in the National Health Service to observe the recommendations of the British X-ray and Radium Protection Committee about protection and working conditions in X-ray and radium departments. This code of practice was, however, in some respects out of date, and the Minister of Health hoped to bring into operation shortly a revised code approved by the Radioactive Substances Advisory Committee which included a section on the disposal of radioactive waste.

Allegation against M.R.C. Refuted

Mr. PETER FREEMAN asked the parliamentary secretary to the Ministry of Works whether he was aware that a number of cases had recently been brought to the courts of cat-stealing on a large scale and that several people had been convicted for this offence; that these cats had been stolen for sale to medical research laboratories, as admitted in court; that the cost of the defence and the fines had in some cases been paid by the Medical Research Council and that they had employed the same counsel, details about whom have been sent to him, in most of the cases; what authority existed for the payment of such expenses out of public funds; how much had been spent on each of these cases in the last six months; and what action he proposed to take to prevent a recurrence of such incidents.—Mr. BEVINS replied: I am glad to have the opportunity of stating, quite unequivocally, that there is no truth whatever in the allegations against the Medical Research Council.

In answer to further questions he added that the Lord President had been into the matter with the most meticulous care and he was satisfied that none of the suggestions contained in the question was based on evidence. The barrister whose name was supplied to the Lord President by Mr. Freeman had had no contacts of any sort with the M.R.C. Defendants in court sometimes told the truth and sometimes they did not.

Mr. Freeman said that he would raise the matter again at the earliest possible moment.

Doctors' Telephones

Replying to a question, Mr. IAIN MACLEOD, the Minister of Health, said that he was not prepared to seek powers to ensure that general practitioners in the National Health Service should be available to their patients on the telephone. But, without pre-judging any entirely exceptional case, it seemed clear to him as a general matter of common sense that a doctor providing general medical services was not in a proper position to fulfil his obligations to visit his patients when their condition so required if he did not make reasonable arrangements for them to communicate with him by telephone.

Leprosy Treatment in the Colonies

Mr. L. W. B. TEELING asked the Secretary of State for the Colonies how many leprosy hospitals there were in the Colonies, and in what Colonies patients with leprosy were refused permission, even when suitably accompanied, to visit towns away from the leprosy centres.—Mr. HENRY HOPKINSON, Minister of State for the Colonies, replied: There is an institution for the treatment of leprosy in every Colony in which the disease is endemic, either in leprosy hospitals, outpatient departments of general hospitals, or in separate settlements or villages. Contact of patients under treatment with the general public is related to the risk of infection in each case. Mr. TEELING: Is the Minister aware that recently there have been so many discoveries with regard to leprosy that it is considered by those who are studying this disease that it is no longer really necessary to have these completely isolated settlements? Will he make sure that the Colonial Office is keeping that in mind?

Dr. BARNETT STROSS: May we take it that it is now accepted that leprosy is not a dangerously infectious or contagious disease and that free movement does not necessarily bring danger to the community at large?—Mr. HOPKINSON: Yes, sir. The danger depends, of course, on the specific case, but in the general way people still retain a very serious dread of the disease. Only education as to the effects of modern drugs, and so on, will eradicate that fear.

Obituary

GEORGE FORD PETRIE

M.D. Aberd.

Dr. George Petrie, lately retired from the staff of the Lister Institute of Preventive Medicine, died at the age of 81 on March 17.

He graduated in medicine from Aberdeen University in 1898 and five years later took the M.D. with highest honours. As an undergraduate he had shown leanings towards pathology and was awarded medals in this subject. After qualification he became for a time an assistant in general practice till, in 1902, he was appointed assistant bacteriologist to the Lister Institute, working in the serum department at Elstree under the late Dr. George Dean. In 1905 he served as a member of the Plague Commission under the late Sir Charles Martin in India and again from 1911 to 1914 under Dr. Charles Todd in Egypt. During the first world war he was commissioned in the R.A.M.C. and worked as a general bacteriologist in France. After the war he returned to the Lister Institute, and in 1919 he rejoined the serum department at Elstree, of which he was appointed bacteriologist-in-charge in 1926. From then until his retirement in 1939 he carried out investigations into a wide variety of bacteriological and immunological problems, and was responsible for the production and standardisation of many antisera. It was on the firm foundations laid by him that the large-scale production of potent antitetanic serum was based. During the late war he came out of retirement for some years to resume charge of the serum department of the Lister Institute.

Dr. Petrie's publications included many papers dealing with epidemiological, bacteriological, and immunological subjects. In 1934 he published a book with the late Sir Alexander Fleming on recent advances in vaccine and serum therapy. During his retirement he arranged an anthology of *British Medical Science and Practice*.

C. T. writes: "Petrie was a conscientious worker. He was a delightful companion with many interests, particularly in natural history. He was also a great reader, especially of the more classic English literature. In his earlier years he was an incessant smoker and sometimes in the middle of a meal he would absentmindedly light his pipe and go on talking, having forgotten all about the next course. During my long absence from England I lost intimate touch with the details of his work, but we managed generally to meet almost every year. I shall miss him sadly."

Mr. A. F. MACCALLAN, consulting ophthalmic surgeon to the Westminster Hospital, London, died on March 31 at the age of 82.

In England Now

A Running Commentary by Peripatetic Correspondents

THE sport of underwater swimming, fishing, and photography is becoming the rage, with clubs devoted to it springing up all round (one in this country is said to have a thousand members). A spate of books and films, both fictional and documentary, has stimulated Tom, Dick, and Harry, with their wives and children, to emulate Hans and Lotte Haas, Captain Cousteau, and the Criles. So it is not surprising that the First International Exhibition of Underwater Exploration and Photography is now being held.[1] Most of the exhibits are photographs of many familiar and some unfamiliar incidents from the books and films, and some show a few of the difficulties experienced by Walt Disney's photographers, one of whom had to stand on his head to adjust the camera. Strange fishes (who will be the first to photograph the cœlacanthus in its natural habitat ?) and beautiful coral gardens abound, and H. G. Vevers shows his carpet of Brittle Starfish at Plymouth. Other exhibits include watertight cases to enable ordinary cameras to be used under the sea, a watertight compass (presumably to prevent taking the wrong turning), and watertight binoculars (as already used by bird-watchers in marshes).

And last, but decidedly not least, there is, posing alternately in sea-green and in snow-white diving costume and wearing frogman's flippers, a real live mermaid, who made me want to visit Copenhagen to find out if Hans Andersen's had become detached from her rock.

* * *

When the canal was frozen the rats, having nowhere else to go, came to us. So I went to see the sanitary inspector who said if I put five bob down he would send a chap round to get rid of them. When I got home at lunch-time I said to my wife :

" Has Ratty come ? "

" Yes."

" What's he say ? "

" Nothing."

So I went to have a chat with the Rat Man. Rather posh chap with a corduroy cap very straight on his head.

" I didn't like to say anything to your wife," he said ; " women are easily upset ; but I don't think you ought to leave the child in the pram."

" The child ? "

" Well you never know."

Then he took me round the garden. The place was like a Swiss cheese with rat holes.

" Well, where do we go from here ? " I said.

" I will bait the holes."

" And that will be the end of them ? "

" They don't die straight away. That was the old method. They would die near the hole and then the next rat would come along and smell a rat, so to speak, and wouldn't touch the bait. With this new bait they get internal hæmorrhage and die three or four days later."

" That's clever."

" It was worked out in America."

" Well work it out here, chum, and I'll be grateful."

When Ratty came back on the following Thursday he inspected the bait and most of it had been taken.

" Has it been taken ? "

" Yes, indeed. This is a very effective method."

" Where do they die ? "

" Well it *could* be in the house."

" In the house ! "

" Could be. Or it could be outside. If they die in the house under the floor-boards they won't smell unless they happen to be near hot pipes."

" Shall we block the holes up now ? "

" No, no. I shall lay more bait and if that is touched there will still be more around."

" And how long does this caper go on for ? "

" If it *does* go on it means the drains are fractured."

" Why bring in the drains ? That's expensive. If they have to dig up the drains it'll cost a mint."

" We can find out if the drains are fractured without having to dig them up by the smoke test."

" Thank God."

" But it fills the house with very acrid fumes. Your wife should be warned."

" If I warn her any more she'll be off."

" The smoke is blown down the W.C. pan and if there is a fracture it comes up in the garden at the site of fracture."

" Sounds simple. Go ahead and let me know the worst."

I went in to the wife.

" Have they gone yet ? " she asked.

" Not quite. He's going to fill the house with smoke."

" What for ? "

" To see if the drains are fractured."

" Well I think it's ridiculous : when we had rats in Rhos we put down traps and caught them."

" That's out of date. You must move with the times, old flower."

On the following Monday I met Ratty in the garden.

" Well, what's the form ? "

" I'm very disturbed. They should have gone but they haven't. The smoke test was negative."

" Well I'm not a pro at this game but I think all the holes should be plugged up right away. The house will be in ruins if something doesn't happen."

" You could stop them up, but you might be imprisoning live rats under the house and they will gnaw their way up through the floor-boards, which would be undesirable."

So I went in to see my wife.

" Have they gone yet ? "

" No. Any minute now they'll be coming up through the floor-boards."

My wife is a woman of few words. " Rats." she said.

* * *

We were gratified that our eldest son should be following in both our footsteps, and thought we might help him in his biology for first M.B. Primed with your leading article on Clonal Ageing we lately delivered at the breakfast table what we thought was a masterly account of the habits of the dimly remembered paramecium. There was a disappointing lack of awe at our erudition. Instead, as might have been foreseen, we are now referred to as " the ageing clones."

* * *

Your leader on Man in Space was perfectly timed ; for it was in my hands just ten days before my son, aged 10, returned home for the Easter holidays. With what nonchalance was I able to meet the abrupt inquiry, " Dad, do you know about the Heat Barrier ? "

But my relief was short-lived—for now I don't know which Heat Barrier Jonathan was discussing. There is a band of heat around the Earth of a limit not given which holds toxic amounts of ozone and a high temperature not specified. Further on we come to Space. Space is not defined in this sense by my edition of the *Concise Oxford Dictionary*—I must get an *Encyclopædia Britannica*—but it has a vacuum temperature of 4000°F.

It may be the step from the great cold into Space that Jonathan has in mind. I think that this must be the Heat Barrier, because I now learn that when you reach the Heat Barrier " you are disintegrated," which is poor reward for having survived the discomforts, hazards, and minor sound, heat, and cold barriers earlier in the voyage.

* * *

A somewhat fussy, elderly lady came to see me after an interval of some years. I examined her ; we exchanged the usual social chit-chat about weather and shortcomings of this year's sweet-peas ; she sat waiting for her E.C.10. Unfortunately I am a man-who-never-forgets-a-face-but-has-no-memory-for-names. I did not wish to offend an old patient ; but I racked my brains in vain. At last inspiration came to me " I have forgotten how to spell your name, " I said innocently. " J-O-N-E-S," the lady replied tersely and never returned to my surgery.

* * *

Lines composed in the neighbourhood of the R.S.M. on a weekday afternoon :

Parking is such sweet sorrow
That I shall drive around and round and round and round
till it be morrow.

1. In the gallery of the Royal Society of Painters in Water-Colours 26, Conduit Street, W.1, from April 4 to 30.

Letters to the Editor

GENETIC EFFECTS OF THERMONUCLEAR EXPLOSIONS

SIR,—Some of the more pessimistic views recently expressed on the genetic dangers of peace-time thermonuclear explosions are unrealistic. They take no account of the eugenic counter-measures which mankind will surely take.

No reliable figures for the effect of a given dose of radiation on mutation-rates in man are available; but it is not unreasonable to suppose, as you do in your annotation last week, that two explosions yearly might double the natural level of radiation and hence the mutation-rate. An increasing programme of explosions would have a correspondingly greater effect. But this does not mean that the human species will undergo irreversible genetic deterioration.

First there is the question whether an increase in mutation-rate is harmful. Some human geneticists believe that it is impossible to say whether a gene is "good" or "bad" in its effects. A mutation lethal in the homozygous state may be beneficial in the heterozygous state. Further, they claim that it is impossible to predict the future, so that a mutation now harmful may be useful in future environments. These are not my own beliefs and so I will not elaborate them further. It is, I think, probable that most mutations are harmful, that most of them are either recessive or dominants of low penetrance, and that ultimately the balancing by natural selection even of the present mutation-rate requires fairly high miscarriage, stillbirth, and childhood-death rates.

Even so the dangerous effects of an increase in the mutation-rate can be prevented provided that mankind is prepared to undertake control of his own evolution. Surely a few groups at least of such a resilient species as our own will make this attempt some time in the centuries before the increased mutation-rate can cause a disastrous fall in average fitness. The initiative will probably come, not from governments, but within individual alert and responsible families.

The great potential effectiveness of such artificial selection depends on the fact that most mutations affect only a small proportion of those who possess them, the remainder being apparently healthy carriers. This is the case whether they are mainly dominants of low penetrance or recessives exerting an effect only in the homozygous state. Within the next century or so it will be possible to identify most of these genes in the carrier state. This is already possible with the genes responsible for thalassæmia major, sickle-cell anæmia, and one form of sex-linked choroidoretinal degeneration. Once symptomless carriers can be recognised it is possible to encourage them to plan a family size below replacement-rate. For example, if the heterozygotes for any rare recessively determined condition aim at a family size of only two children and thus have a fertility, say, of only three-quarters of those homozygous for the normal gene at that locus, this will prevent any increase in the frequency of the gene concerned even though the mutation-rate is increased, say, a hundredfold from 1/40,000 to 1/400.

This is selection against a single mutation. Selection against a great many mutations naturally means that selection against any one of them must be less intense. We are probably all carriers of some deleterious mutations. Once the knowledge is available the aim of artificial selection would be to lower the fertility of those with an undue total number of deleterious mutations. But even such mass selection can have considerable effect. Any calculations are hypothetical. One estimate, by H. J. Muller,[1] is that the present mutation-rate would be balanced if the 3% of the population with the highest number of mutations did not have children. A sliding scale relating the planned family size of each individual couple to the number of mutations they possess would be still more effective in eliminating mutations. In a real emergency unorthodox methods of achieving highly selective reproduction will be available, such as the widespread use of artificial insemination with donor semen almost free from mutations.

The task of determining how many mutations each individual carries is obviously a major one; it may well become one of the chief tasks of the family doctor. But it is possible meanwhile that much could be done by purely phenotypic selection—a process which is already occurring among the groups who effectively plan the size of their families.

Any talk, therefore, of the end of the human race from peace-time experimental thermonuclear explosions is unjustified, provided that man's knowledge of human inheritance advances and he is willing to apply it. Even with current mutation-rates, some artificial selection will ultimately be needed to maintain our present health standards. Once the practice of such artificial selection is accepted it could keep the balance against considerably higher mutation-rates. Even the danger of war with thermonuclear weapons, to which Dr. Summerskill drew attention so dramatically in the House of Commons the week before last,[2] would seem to lie more in the loss of our scientific knowledge of how to deal with the increased mutation-rate than in the increased mutations themselves. But if war seemed imminent it would obviously be a prudent precaution to store considerable amounts of germ-plasm in radiation-proof containers, in the hope that survivors might retain the skill to use this rather than their own damaged germ-plasm for reproduction.

Orpington, Kent. C. O. CARTER.

COUNTING THE SWABS

SIR,—Every surgeon will agree with Mr. Riddell's statement (March 26) that it is the instrument nurse's duty, and hers alone, to count the swabs before and after an operation. The surgeon must take care that no loose swab ever enters the abdomen, that all small ones are on holders and all large ones have a corner or a tape, to which a forceps is attached, lying outside the abdominal cavity. At the conclusion of the operation he must ask her if the count is correct, and help her in the search if it is not. But if he attempts to do the counting himself, that essential element in all safety precautions—the complete responsibility of one individual for each item—is lost.

There may be considerable anxiety when the count is not correct. The surgeon makes a thorough search for the missing swab. It is not in the operation site. It may turn up between the towels and the patient's body, wrapped round the specimen that has been sent to the pathologist, or even stuck between the sole and heel of the assistant's boot.

I was faced with such a problem four years ago.

After three counts and three careful searches in the abdomen one large swab was still missing. The patient had by now had enough, and I was forced to close the abdomen. I consulted my solicitors and was advised to tell the patient frankly that a swab was missing at the end of the operation, that I had searched for it, and that I did not think it was in the abdomen. He was first incredulous, then deeply distressed. His postoperative course was stormy. He ran a temperature. He and I felt (or thought we felt) a lump in the left hypochondrium. However he made a slow, but satisfactory, recovery. I saw him once a month for six months, and

1. Muller, H. J. *J. hum. Genet.* 1950, **2**, 111.
2. See *Lancet*, April 2, 1955, p. 725.

then at three-monthly intervals for two years, but the missing swab has never been accounted for.

Anxiety over the missing swab has been largely abolished by the use, for small swabs at any rate, of gauze into which an opaque strand has been woven. These radio-opaque sponges have been in regular use in America for at least ten years and they are now available in this country. Their use in the case I have recounted would have saved the equivalent of ten years' wear and tear on the coronary circulation of two people.

London, W.1. HENEAGE OGILVIE.

TUBERCULOSIS IN IMMIGRANTS

SIR,—I am reluctant to prolong a discussion to which you have already given much space, but I must challenge the inference which Dr. Doig (March 19) draws from his figures of tuberculosis mortality and morbidity in the island of Lewis.

The percentages of tuberculin-positive children, even in towns, are not high; and it is quite usual, in remote districts, to find small areas in which there are many positive tuberculin reactors, among whom new cases of tuberculosis will appear and who, because they are so far from hospital and radiological facilities, may die of the disease. It is not so long since Dr. Doig was pointing out (Jan. 15) that it was the tuberculin-positive young adults from his island who developed tuberculosis when they left home to work, and he cannot be permitted to argue both ways. If he is right, however, in his assumption that a high death-rate from tuberculosis is consistent with a high tuberculin-negative rate, then Lewis is unique, because elsewhere the opposite is true. A typical example is in the Philippines, where over 50% of 3-year-old children, 80% of 10-year-old children, and 90–100% of adults over 20 react to tuberculin.[1] Tuberculosis is the leading cause of death among Filipinos. Palmer and Shaw,[2] in an extensive investigation of the results of B.C.G. vaccination, found a negligible number of new cases and deaths in vaccinated persons and in unvaccinated tuberculin-negative controls, but they found that morbidity and mortality from tuberculosis were almost confined to those who were naturally tuberculin-positive at the beginning of the survey.

The same applies to Ireland. The idea that tuberculosis arrived here recently is quite fantastic; it was recorded as a cause of death in Irish cities in the 17th century, and I have no doubt that it was known much earlier. The enormous increase in the population of Ireland between 1695 and 1841, from 1 million to 8 million, was mainly in the rural population, in tenant farmers, and in labourers.[3] The subsequent overcrowding and malnutrition made an epidemic of tuberculosis inevitable, and the great famine of 1847 gave a tragic impetus to the disease throughout the 19th century. Death and emigration reduced the population as rapidly as it had increased, and many rural areas which had formerly been congested became sparsely populated. Regrettable as this was from a national point of view, it had the effect of limiting the spread of infection; and in recent years, as Dr. Flynn and Dr. Joyce (Feb. 26) rightly stated, modern methods of diagnosis and treatment have reduced the amount of disease still further. It is important to remember, therefore, that if many young people in the Irish countryside are tuberculin-negative, it is not because infection has not yet reached their districts, but because it has already left them. Certainly in Northern Ireland, and apparently in Eire as well, tuberculosis in rural areas is no longer a problem of any size or importance. It is prevalent only in the cities and large towns which for so long have been thoroughly "tuberculinised," and which contain the highest percentages of young positive tuberculin reactors.[3]

The Irish are not the only immigrants amongst whom tuberculosis has been common. Plunkett [4] has drawn attention to the problem of tuberculosis among displaced persons from Europe who were admitted to the United States after the 1939–45 war. In Israel the incidence of tuberculosis is now several times greater than it was in 1947, and this is attributable to indiscriminate mass immigration.[5] No-one would attempt to argue that displaced persons from Europe and Jewish immigrants in Israel were lacking in experience of tuberculous infection, or to deny that they had taken their infection with them. But Dr. Hess and Dr. Macdonald (Feb. 12) believe, without having carried out a single preliminary test, that it is the tuberculin-negative Irish who develop disease in England; and it seems strange that too little infection in the native country should have the same effect as too much.

I do not deny that individual or even racial susceptibility can vary, or that social conditions will modify the incidence of tuberculosis for better or worse; but I do insist that the intensity of infection in any country is the decisive factor in causing tuberculosis, and that the elimination of infection is at present the only means we know of preventing it. Ultimately the immunising fraction of the tubercle bacillus will almost certainly be isolated, but so far there is no convincing evidence that artificial "tuberculinisation" with B.C.G. vaccine can succeed where the natural process has so obviously failed.

The task of eliminating infection is difficult but no longer impossible, and the goal before us in the United Kingdom is not merely the control but the eradication of tuberculosis. The task is not made easier by those who point out spurious short-cuts upon which to waste energy and resources.

Dungannon Chest Hospital,
Dungannon,
co. Tyrone. E. F. JAMES.

B.C.G. VACCINATION

SIR,—The points raised by Dr. Webster (March 5) and Dr. Loxton (March 19) are, of course, of the greatest importance in arriving at any conclusion on the value of B.C.G. vaccination. Unfortunately our knowledge on immunity in tuberculosis is still very incomplete, and at present I do not think it is possible to state the relationship of tuberculin hypersensitivity to immunity, but many authorities believe that the former is an expression of the latter, although the lack of hypersensitivity does not indicate an absence of immunity.

B.C.G. vaccination is based on the assumption that recovery from a primary tuberculous infection, be it caused by virulent or by attenuated bacilli, confers a certain degree of acquired resistance to subsequent infections. The degree of the acquired resistance conferred will vary from individual to individual, and the possibility of developing active disease after vaccination will depend on the age of the individual, the magnitude of the infecting dose, and the cellular response to the invading bacilli. I agree that the last phrase begs the question, and it is by making such statements that we "go round the mulberry bush" of immunity.

It is probable that a high state of resistance to tuberculous infection is present in persons who have become desensitised by repeated infections. Evidence for this is found in the state of tuberculin anergy that is attained by some persons who have worked in a highly infectious environment for many years, and also by the state of "positive anergy" in children who have been given B.C.G. orally over a number of years. Sayé,[6] in his vaccination work in Barcelona, is able to produce, by repeated oral vaccination, a state that reacts very feebly, or not at all, to the jelly patch test, but may still be sensitive to $^1/_{10}$ mg. of B.C.G. given intradermally. Sayé terms this *l'allergie attenuée* or *latente* and considers it evidence of the optimum degree of resistance. This state corresponds to Godlowski's second type as described by Dr. Loxton. Whether this state is more immune to infection than the one of tuberculin sensitivity that we are producing by the usual method of vaccination in this and many other countries, has not yet been deter-

1. Vergara, J. J. Proceedings of the Pan-Pacific Tuberculosis Conference, Manila, Philippines, 1953; p. 506.
2. Palmer, C. E., Shaw, L. W. *Amer. Rev. Tuberc.* 1953, **68**, 462.
3. Tuberculosis in Ireland: Report of National Tuberculosis Survey (1950–53), submitted to the Medical Research Council of Ireland. Dublin, 1954.
4. Plunkett, R. E. *Trans. nat. Tuberc. Ass., N.Y.* 1952, p. 493.
5. See *J. Amer. med. Ass.* 1954, **155**, 1519.
6. Sayé, L. *Pr. méd.* 1953, **61**, 524.

mined. If it is so, then repeated B.C.G. vaccination by the oral method does satisfy Dr. Loxton's demand "for a vaccine which will confer immunity, and will, at the same time, desensitise the patient."

May I take this opportunity to correct what might give a wrong impression in my article (Feb. 12)? I stated that the relapse-rate to tuberculin anergy in Ireland is 20·72%. On referring to the original work of the late Dr. Dorothy Price,[7] I find that this figure included an exceptional group and that a more correct figure would be 11·8% over a period of two or three years' observation. In addition to the reasons I stated for the reversion-rate, I am grateful to Dr. St. John Cowell, the medical director of the National B.C.G. Committee, St. Ultan's, for reminding me that in Eire the Swedish vaccine is used on a rural population, and the Danish on an urban one; also that the follow-up at St. Ultan's was for two or more years. The chances of superinfection by virulent organisms in Dublin City are greater than in the rural areas, so the reversion to tuberculin anergy will be less frequent. The fact remains that reversion is an important event, and the possibility of it must be continually borne in mind in B.C.G. vaccination campaigns, particularly in infants and young children.

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FREDERICK HEAF.

PURE RED-CELL APLASIA

SIR,—The case described by Dr. Fountain and Dr. Dales (March 12) provides another interesting example of the complexity of these unusual anæmias. Their conclusion that oral cobalt therapy led to the patient's recovery could be of the greatest importance, and it will be most interesting to see, should the patient relapse, whether cobalt will again prove effective.

I have given a solution of cobalt chloride (in daily doses of 100–300 mg.) to two patients with "pure red-cell anæmia." This resulted in no improvement, but prolonged treatment was impossible because the patients seemed intolerant of the preparation. There was certainly no immediate improvement, as in the case described by Fountain and Dales. They cite the case reported by Seaman and Koler [8] in which cobalt therapy was of value in erythroid hypoplasia, though the patient did not improve until after 64 days of continuous cobalt treatment—a surprisingly long time when compared with other hæmatinics and the experience of Fountain and Dales.

I wonder whether more credit should not be given by Fountain and Dales to the effect of splenectomy in their case. It was followed by progressive increase in numbers of marrow-erythroblasts for 3 months after the operation. Apparent benefit from splenectomy was delayed for nearly a month in a somewhat similar case I have studied, and 4 months' delay for improvement in blood values after splenectomy is probably not impossible.

Any means of treatment which will avoid repeated transfusions to such patients deserves energetic study. Only recently a patient of ours (Chalmers and Boheimer,[9] case 1) died from hepatic cirrhosis and general siderosis although recovery from pure red-cell anæmia had been complete for over 2 years and he showed no hæmatological relapse in his final illness. He had previously received some 55 pints of blood at a time when erythropoiesis was absent. In his terminal illness he did not want venesections performed, and it was tragic to see a death probably due to the late effects of a measure which had earlier been the sole means of keeping the patient alive.

St. George's Hospital,
London, S.W.1.

J. N. M. CHALMERS.

7. Price, D. S. *Irish J. med. Sci.* February, 1954, p. 56.
8. Seaman, A. J., Koler, R. D. *Acta hæmat.* 1953, **9**, 153.
9. Chalmers, J. N. M., Boheimer, K. *Brit. med. J.* 1954, ii, 1514.

A LIVER POISON WITH UNUSUAL PROPERTIES

SIR,—Dr. With has called attention (March 19) to the work of Quin [1] showing that administration of the South African plant *Lippia rehmanni* (verbenaceæ), or alcoholic extracts of the plant, to sheep causes inhibition of biliary secretion and consequent jaundice without evident hepatocellular damage. He does not add that the active principle was later isolated by Rimington, Quin, and Roets,[2] and named "icterogenin." It was shown to be a triterpenoid acid and to arise in the leaves of the plant during active growth and to be translocated and stored in the fleshy root bark.

Atony of the fore-stomach and large intestine and bilirubinæmia regularly followed administration of 1·5 g. of crystalline icterogenin by stomach-tube to sheep. Fairly extensive pharmacological study showed that icterogenin inhibits the smooth muscle of the gut and the isolated, perfused heart. It is mildly hæmolytic in vitro. The jaundice which follows its administration by mouth is not hæmolytic; it seems, rather, that the pigment excretory function of the liver is temporarily impaired.

Recently Barton and de Mayo [3] have further studied the chemistry of icterogenin and have completely elucidated its structure. I am at present awaiting a new supply of material from South Africa with which the icterogenic property of the drug is to be investigated more fully in association with Dr. G. H. Lathe and Dr. B. H. Billing.

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School, London, W.C.1.

C. RIMINGTON.

THE HAIR OF THE PILONIDAL SINUS

SIR,—Mr. F. E. Weale (Jan. 29) describes some ingenious histological investigations on the hairs of natal-cleft pilonidal sinuses, showing that they all lie with their roots deeply; and he concludes that "the sinuses are therefore developmental defects." His facts seem conclusive; but his conclusion depends on two assumptions: (1) that this is what one would expect if the sinuses were developmental, and (2) that such an arrangement of the hairs rules out the possibility of an acquired origin.

On the first point, there is no obvious reason why a developmental sequestration of skin should produce hairs running only in one direction, and Mr. Weale's further assumption that the hair-bearing is limited to a "fairly circumscribed area" at the cranial extremity of the sinus stretches the developmental hypothesis still further beyond what is reasonable.

It is on the second main assumption that we wish particularly to comment. There is a very clear explanation of why hairs should enter a natal-cleft sinus with their root ends in advance. One of our students—Mr. E. S. Williams, B.SC.—has reminded us of the countryman's old trick of making a head of barley progress up someone's sleeve, merely by introducing it base first; and he has pointed out that the mechanics of propulsion of a hair are similar. The scales of a hair are so arranged that their free ends point peripherally. As a result, if a hair is stroked along its surface from the root to the periphery there is little movement of the hair, owing to the slight frictional resistance. If, however, a hair is stroked from the periphery to the root, there is considerable frictional resistance from the free ends of the hair scales, and the hair is propelled in the direction of its root. (One can readily confirm this by placing a hair in the palm of the hand and rubbing to and fro along its axis with a finger of the other hand.)

Applying these mechanical principles to the natal cleft, shed hairs will naturally tend to lie longitudinally owing to the configuration of the cleft. The normal frictional movements between the sides of the cleft will propel the hairs either cranially or caudally according to the direction in which

1. Quin, J. I. *Onderstepoort J. vet. Sci.* 1933, **1**, 501.
2. Rimington, C., Quin, J. I., Roets, G. S. C. *Ibid*, 1937, **9**, 225.
3. Barton, D. H. R., de Mayo, P. *J. chem. Soc.* 1953, p. 887.

the root of the hair happens to be pointing. If a sinus or pit is present, many of the cranially propelled hairs will enter its orifice, invariably root first. The same forces will resist the expulsion of the hairs and tend to force their roots still further into the depths of the sinus. They may also drive an infected hair into the intact skin, and thus initiate a pilonidal sinus.

Up till now, the one flaw in the hypothesis of the acquired origin of natal-cleft pilonidal sinus has been the doubt on how the hairs got in. We have in the past suggested a suction mechanism, and it may be that this does play a part in the digital-cleft sinuses of barbers. But in the natal-cleft pilonidal sinus, we now believe that movement of the hair under frictional influences, as described above, is the essential factor. Mr. Weale's observations on the lie of hairs in a pilonidal sinus, by drawing attention to the hair scales, have thus indirectly led to the filling of the one important gap in the case for the acquired origin of natal-cleft pilonidal sinuses. Of the acquired origin of most other varieties of pilonidal sinus there has never been any doubt.

The Middlesex Hospital, London, W.1. DAVID H. PATEY
R. W. SCARFF.

HYPOTHERMIA IN THE NEWBORN

SIR,—I was very interested to read Dr. Trevor Mann's letter in your issue of March 19. I agree with Dr, Smallpeice and Dr. Everley Jones (March 26) that this condition is no new one. I have seen 24 cases in the last ten years and they have all been in the winter months: November, 1; December, 8; January, 5; February, 8; March, 2.

Like Dr. Everley Jones, I call the condition sclerema. Reference to textbooks on the disease is disappointing. It is usually dismissed in a very few lines as a rare and almost invariably fatal disease with no seasonal incidence. It certainly is not very rare; many of the cases recover; and the seasonal incidence is marked.

Sclerema is always present. I, too, have purchased a low-reading thermometer, and the following are the temperatures recorded by me: 90·5, 90·4, 91, 96, 87, 93, 88, 84, and 86°F.

The treatment that I usually give is thyroid extract gr. $^1/_{10}$ three times a day, vitamin E 5 mg. daily, penicillin, and warmth. The majority of the babies survived. I know for certain of only 5 deaths, but my records are incomplete. I was not aware of the danger of rapid heating, and I hope that in future more temperate treatment will produce even better results.

Leicester. J. VERNON BRAITHWAITE.

SIR,—Dr. Trevor Mann has performed a useful task in drawing attention to the syndrome of hypothermia neonatorum. We also see a few such cases each year. Although they all occur during the winter months, it is not always easy to correlate the development of the syndrome with a cold environment. The rooms in which the babies have been kept have sometimes seemed to be adequately warm, nor have the cases always arisen during very cold weather. My last one developed during the thaw that followed a cold spell. The relationship between hypothermia and sclerema is also somewhat inconstant in my experience. I have had cases of severe hypothermia without sclerema and of sclerema without hypothermia.

I would entirely endorse Dr. Mann's remarks regarding the danger of warming these babies too rapidly; but I have found that small doses of thyroid extract are beneficial.

D. A. J. WILLIAMSON.

Royal Hampshire County Hospital, Winchester.

SIR,—I read with interest Dr. Mann's communication. I wonder if he would consider trying to warm these babies by the technique described by Khalil and Mac Keith.[1] They insert into the stomach a plastic tube with a rubber balloon attached to the end. Warm water is injected into it and withdrawn at intervals after it has had time to supply heat to the body—i.e., to the large vessels adjacent to the stomach. The method was actually used to lower the body-temperature of a hyperpyrexial child; but the authors state that it could be equally well used to supply heat, and they suggest that it has several advantages over the method of warming patients by external heat.

Keats' House, Guy's Hospital, London, S.E.1. PAUL E. POLANI.

RUPTURE OF LAPAROTOMY WOUNDS

SIR,—Three weeks ago, at the conclusion of a partial gastrectomy, the aponeurotic layer of my abdominal wound was closed with interrupted sutures of nylon (no. 7) sterilised by the normally approved methods. Forty-eight hours later a cough of very moderate violence caused every suture to snap at a point well clear of the knot. There was no staining of the dressing either then or at its later removal, but a patch of surgical emphysema appeared on the left anterior thoracic wall giving a clue to what had happened. Successful resuture with linen thread followed.

This experience makes me doubt whether nylon is so perfect a suture material as is claimed by Mr. Mills (March 26). If Mr. Mills consults the fishing periodicals of the past seven years he will find a voluminous and acid correspondence on the erratic tensile strength of nylon; and certainly I cannot enthuse over a material which holds neither my fish nor my anterior abdominal wall.

London, S.W.7. FRANK GREENWOOD.

CONGENITALLY SHORT FRENULA OF UPPER LIP AND TONGUE

SIR,—We should like to congratulate Mr. Michael Oldfield (March 12) on his exposure of two myths: firstly, that "there is no such thing as tongue-tie," and secondly that operations on frena of tongue or lip are unnecessary and useless. These two common errors arise, we feel sure, from two sources: students are rarely, if ever, taught anything about the matter; and on referring to a textbook they find such negative sentences as above which have probably been copied from edition to edition without thought or verification.

Operations almost identical with those described by Mr. Oldfield have been done routinely at this hospital for many years when indicated. To those who doubt the necessity for these little operations we would say, "try yourself to say D or T with the tongue held no higher than the lower incisor teeth." It is quite impossible; nor can L or S be pronounced clearly. Take any short sentence and note how frequently these sounds are required to render speech intelligible.

The frenum labii certainly sometimes causes an unsightly space between the central incisor teeth, and is also the cause sometimes of an ugly sibilant lisp in speech. If the frenum is abnormal it should be treated as such. The teeth will come together and speech become normal—provided it is done in time and not left until adolescence. Dentists sometimes say that this operation is unnecessary because the space can be eliminated by an orthodontic appliance, but if the abnormal frenum persists the teeth will revert. Operation takes much less time and is more certain. There is only one point on which we are not in accord with Mr. Oldfield—namely, in the use of intratracheal anæsthesia for young children.

Several workers have pointed out the risks of tracheal trauma and the formation of a membranous plug, and we agree. Fine intranasal catheters passed to the pharynx are,

1. Khalil, H. H., Mac Keith, R. C. *Brit. med. J.* 1954, ii, 734.

we find, excellent and sufficient for such short anæsthesias; with the head dropped low no pharyngeal packing is necessary, and if one is sufficiently quick with mosquito forceps there is no loss of blood whatever. Treated thus the patient need not be in hospital more than a few hours.

Simple division, we agree, is useless—recurrence is the rule. One typical case we would cite.

A boy, aged 8, had very defective speech. He had been seen by several doctors, and his mother had been told that all authorities were agreed that there was no such thing as "tongue-tie"; he had also had courses of speech therapy without improvement. On examination an extremely short frenum linguæ was obvious. His tongue could not possibly make tight contact with his palate for L, D, T, and S. An operation essentially as described by Mr. Oldfield was done, and with very little instruction he quickly spoke quite normally. How much better, though, if the defect had been discovered in infancy and all his mother's worries and his own troubles at school had been avoided.

Bassam Hospital, near Wellington, New Zealand. CECILY M. PICKERILL
H. P. PICKERILL.

ENURESIS

SIR,—Your leading article (Feb. 19) and the subsequent correspondence emphasise that enuresis is a symptom in which conventional concepts of medicine are inadequate. Physiological, pathological, or psychopathological investigation separately will not give the whole picture, though many useful observations have been made by such means.

Enuresis is a good example of an illness that should be studied "as a patch of personal biography," and as such it may go beyond the individual. We should not pay undue attention to the mechanics of micturition unless there is a structural abnormality or some other relevant lesion. Enuresis is more often found to be evidence of tension in relationship between the patient and his family; hence the number of instances where a child is enuretic at home but not when visiting or on holiday.

Dicks [1] has said: "Modern child psychiatry has long recognised that stress in a family cannot be compartmentalised. We know that the whole unit is involved, even though only one member may present himself as a patient." The fact is that our investigation and understanding of the problem should go beyond the boundaries of the individual concerned. "Cure" takes place with many therapeutic procedures. Sometimes one patient may be "cured" only for another member of the family to take on the weight of the family disturbance with quite a different symptom.

Department of Psychiatry, University of Leeds. J. H. KAHN.

INACCURACY IN THE LABORATORY

SIR,—Dr. Bassir's letter (March 26) welcoming freeze-dried samples of blood-serum is liable to occasion some misconceptions.

Firstly, the freeze-dried serum is not intended as a replacement of the standard solution in any method: the intention is to provide a serum containing certain constituents in known concentration wherewith a laboratory can assess the extent of the inaccuracy with which a given determination is carried out.

Secondly, the international survey with similar material carried out last year was not available to all laboratories, and, because the results were not available until some time later, was unlikely to be very useful to the individual laboratory as a control of the standard of its work. The object of the international survey was to confirm that the results of a given determination on a given serum vary considerably from one laboratory to another; this was already well known in this country and in the U.S.A., but it may be that the survey served a useful purpose in convincing some European pathologists.

One can only agree with Dr. Bassir that a thorough overhaul of our existing methods, apparatus, conditions of work, and so forth is desirable, with the object of detecting and eliminating the causes of inaccuracy. Dr. Bassir asks whether the clinical value of the laboratory warrants such an effort. If laboratory investigations are to be carried out at all, the results should be sufficiently accurate to be clinically useful; the various surveys have revealed that in many laboratories such a standard is far from being achieved.

Sheffield. ARTHUR JORDAN.

1. Dicks, H. V. *Lancet*, Feb. 5, 1955, p. 295.

MENTAL HEALTH AND PUBLIC HEALTH

SIR,—Dr. Cameron asserts (March 12): "There is no mention of psychology in the syllabus of general training of the General Nursing Council for Scotland."

Yet on p. 8 of the syllabus there is a main heading, Human Relationships, with six subheadings; and on p. 13, under the heading, Mental Disorders, there are subheadings on the relationship between physical and mental illness, psychosomatic disorders, psychoneurosis, and psychosis.

Again, by quoting a single sentence from an address by myself, he gives a false impression of the amount of instruction in the psychology of development and allied subjects provided for nurses taking the subsequent training for the health visitors' certificate.

In Aberdeen a mental-health course was recently organised to bring the knowledge of the older health visitors up to the level of their more recently trained successors: this course lasted for over 40 hours, despite the fact that even these older health visitors were not at the start of the course completely without psychological training.

Dr. Cameron has really provided no evidence to refute the conclusions of the London Study Group.

Health and Welfare Department, Aberdeen. I. A. G. MACQUEEN.

ERETHISM

SIR,—In his most interesting article (March 26) Dr. Aldren Turner mentions that the term erethism is likely to have been coined not from ἐρυθρός but from ἐρεθίζειν.

There can be no doubt about the etymology of erethism, which is almost the transliteration of the Greek *ἐρεθισμός* (excitation, irritation). Nevertheless the word erythism has been used with the same meaning, and thence the suggestion of *ἐρυθρός* as its possible derivation. This, however, would be not only highly irrelevant and inappropriate, but also verbally incorrect, for the English word should be erythrism—a meaningless monstrosity.

Yet even erethism is not a very fortunate term for the condition it is meant to describe, as it denotes a (constant) state of excitation and not a morbid increase of the corresponding quality. Thus, while in English texts the word irritability is used in connection with erethism, the Greek textbooks use the word *εὐερέθιστος* (hyperexcitable).

Unfortunately the term is now well established, and there is little hope of correcting it.

Bethlem Royal Hospital, Beckenham, Kent. G. M. JACOBIDES.

HANDWRITING AND THE PSYCHE

SIR,—Your annotation (March 26) reads as if no work had previously been done on this subject. There is a vast literature on handwriting by Continental and American authors. Everything mentioned in your article is known to students of handwriting who are acquainted with the work of M. Pulver and J. Jacoby—to mention only two.

Handwriting is an expression of the personality, including its development or deterioration. Neurotic or psychotic trends are detectable by those who know their job. I remember Jacoby showing us the signature of Hitler, which had been smuggled out of Germany during the last stage of the war; and the disintegration, compared with earlier specimens, enabled Jacoby to detect the mental decline which was confirmed by later events.

London, W.C.1. E. F. MEYER.

FIRST-AID TREATMENT OF HEAD INJURIES

SIR,—In your annotation of March 26 you make a generalised statement about first-aid manuals, which, you say, ignore "modern knowledge regarding the causes of death after head injury: the grave dangers of inhalation asphyxia in the unconscious patient have not yet filtered into these manuals."

It is a pity that you did not refer to the instructions given in the *British Red Cross First Aid Manual* No. 1 (10th ed., 1952). There, on p. 226, the general rules for first-aid treatment of unconsciousness read as follows:

"Lay the patient *on his side* with uppermost leg flexed at hip and knee, or face downwards with head to one side to prevent any vomit or blood from entering the windpipe and to keep the tongue clear of the airway."

London. HAROLD E. WHITTINGHAM.

SIR,—The importance of maintaining a clear airway in the unconscious patient is one of the primary duties of the first-aid worker. This is laid down in the manual on *First Aid to the Injured* (40th ed., p. 162), issued by the St. John Ambulance Association:

"General rules for treatment of insensibility:
(1) In cases of asphyxia perform artificial respiration.
(2) If breathing is present, lay the patient on his back with head turned to one side.
(3) Do not leave the patient until he has been placed in the charge of another responsible person."

As a divisional surgeon I have emphasised these points in my lectures for years. In first-aid competitions I have seen candidates lose marks heavily for omitting observation of them. This makes it difficult for me to agree with your statement that first-aid manuals give instruction which "ignores modern knowledge regarding the causes of death after head injury."

London, W.1. GILES ROMANES.

*** The passage quoted by Sir Harold Whittingham is unfortunately followed by the words "Alternatively place patient as in fig. 160." Here we see an illustration of the patient laid flat on his back with his head to one side (see also p. 228 of Red Cross manual), as is also advocated by Mr. Romanes in his letter. This position is undesirable after head injuries (1) because it does not provide adequate postural drainage, and (2) because rotation of the head and neck can be very dangerous if (as is by no means rare) the patient has a broken neck as well as a head injury.—ED. L.

METALLIC POISONS AND THE NERVOUS SYSTEM

SIR,—May I add these brief details of two British cases of industrial lead poisoning in adults which have been treated with calcium ethylenediamine tetra-acetate (E.D.T.A.) to the three American cases cited by Dr. Aldren Turner (March 26).

CASE 1.—The patient was a man, aged 42, who was employed in a lead-smelting works on a refining process. He was seen by his private doctor, who diagnosed lead poisoning, but on arrival in hospital was thought to be a surgical emergency. When seen by us twenty-four hours later he gave a history of a similar illness, which had been called lead poisoning, some years before when in the same work.

He was lying still, pale and trembling, and in obvious pain round the umbilicus. His bowels had not moved for four days, and he occasionally vomited yellow fluid. He was edentulous with no blue line, and his abdomen was soft. His hæmoglobin was 68%. While calcium E.D.T.A. was being obtained from a distant town he was given an immediate intravenous injection of calcium gluconate, followed by two subsequent injections. By the time the calcium E.D.T.A. arrived the pain had gone, but 1 g. dissolved in 600 ml. 5% sterile dextrose in distilled water was given twice daily for five days.

CASE 2.—The patient had complained of gradually increasing abdominal pain for three weeks, with vomiting and constipation. The pain was gripping and ill localised, and tended to move from the centre towards the right of the abdomen. He had passed no motions or wind for two days. He was employed in a shipyard; his work was to pile old paint tins, light a fire beneath them, and then, after the paint had been burned off, scour them out with a wire brush. A dust-mask was provided by the management but was not used.

The patient had a good colour; his tongue was furred; he had upper dentures but his own lower teeth with a well-marked blue line. His temperature was 99·9°F, and he was tender in the right iliac fossa. He had a left nephrectomy scar. Surgical opinion was that he had no acute surgical condition. His hæmoglobin was 82%. He was watched for twenty-four hours, during which his condition appeared to be improving, and was given the same dose of calcium E.D.T.A. as in the first case. He made an uninterrupted recovery.

In these two cases the total dose of calcium E.D.T.A. was only 10 g., compared to 30 g. reported by Foreman et al.[1]; but it was given at 2 g. per day, as in their cases. This treatment led to clinical recovery without complications.

Nuffield Department of Industrial Health, University of Durham. R. C. BROWNE.

MELANOPHORE-EXPANDING ACTIVITY OF HUMAN PITUITARY GLAND

SIR,—Dr. Frazer (March 5) suggests that the melanophore-expanding substance which we have demonstrated in human pituitary tissue may be adrenaline. There are three reasons why this is unlikely.

We have never been able to demonstrate that adrenaline behaves like corticotrophin or melanocyte-stimulating hormone with respect to oxycellulose. Nor have we been able to show that the *Xenopus lævis* used in this laboratory are particularly sensitive to adrenaline. Doses of the order of 100 μg. are necessary to produce detectable darkening, and these are usually associated with marked mucus secretion by the animals. The pituitary extract which we prepared caused no secretion of mucus and produced a darkening in considerable excess of that caused by adrenaline.

Baker Medical Research Institute and Alfred Hospital Clinical Research Unit, Melbourne, Victoria, Australia. BRYAN HUDSON
G. A. BENTLEY.

CONCOMITANT GASTRIC AND DUODENAL ULCERS

SIR,—In my recent article (Feb. 5) I said that the well-recognised association between duodenal ulcer and hiatus hernia had not been explained.

I then pointed out that the occurrence of heartburn in patients with duodenal ulcer was an indication that gastric retention and œsophageal reflux were occurring. I went on to suggest that reflux œsophagitis, by causing spasm of the longitudinal muscle of the œsophagus, in due course dragged part of the stomach into the chest.

I have since re-read the chapter on reflux œsophagitis in R. H. Franklin's monograph on the œsophagus,[2] and I find that, though he does not go so far as I did in expressing the view that all hiatus hernias with short œsophaguses are preceded by œsophagitis and caused by spastic œsophageal shortening, he does describe the association between duodenal ulcer and reflux œsophagitis and clearly explains how this may increase, if not initiate, the gastric herniation.

Plainly this was the source of what I mistakenly thought was my own idea, and I regret not having recognised and acknowledged it at the time.

London, W.1. H. DAINTREE JOHNSON.

1. Foreman, H., Hardy, H. L., Shipman, T. L., Belknap, E. L. *Arch. industr. Hyg.* 1953, 7, 148.
2. Surgery of the Œsophagus. London, 1952.

Notes and News

University of Leeds

The following degrees and diplomas have recently been conferred:

M.D.—Richard Burwell (with distinction).

M.B., Ch.B.—Bryan Dawson, M. S. Losowsky (with second-class honours); J. D. Atwell, P. M. Binns, J. M. Challinor, Aileen A. R. Collinson, Patricia J. Corley, R. C. Cotton, A. D. Crew, D. W. Daly, David De Souza, Jean McG. Exley, R. F. Folkes, Margaret E. Hall, Brian McKibbin, Dorothy Mainwaring, D. B. Marshall, Geoffrey Mitchell, M. J. Oldroyd, J. F. Poppleton, Ethel A. Richardson, J. B. Richmond, June M. Roberts, Heather Sanderson, D. R. M. Stuart, P. H. Tattersall, C. M. Tonks, P. J. Truesdale, Evelyn Walker, Jean L. Ward, Geoffrey Warnes, D. A. Youdale.

D.P.H.—Roy Barnes, Ruth M. Bowker, E. P. Griffiths, Diana J. Haiste, I. H. Lewis, J. P. Neylon, A. R. Robertson.

D.P.M.—Harold Ellett-Brown, D. McC. MacGregor, A. H. Moyes, Narayana Chiruvolu Surya, R. W. Whiteley.

University of Liverpool

The degree of CH.M. has recently been conferred on L. F. Tinckler.

Royal College of Surgeons of England

The following Hunterian lectures are to be given at the college, Lincoln's Inn Fields, London, W.C.2: on Tuesday, April 19, Mr. John Foster will speak on current methods of treatment of idiopathic stricture of the valve of Krause; on Thursday, April 21, Mr. Norman Barrett will speak on primary tumours of rib; and on Thursday, April 28, Dr. W. T. Cooke will speak on nutritional and metabolic factors in the ætiology and treatment of regional ileitis. All the lectures will be held at 5 P.M.

Royal College of Physicians of Edinburgh

Kirk Duncanson Fellowship for Medical Research.—The council of the college is shortly to make an award for this fellowship (£600 for two years to begin on Oct. 1). Applications must be sent before May 7 to the secretary of the college, 9, Queen Street, Edinburgh, 2.

Christian Medical Fellowship

This fellowship is to hold house-parties for doctors and their families from May 6 to 9 at Windermere, and from May 20 to 23 at Bournemouth. Further particulars may be had from the secretary, 39, Bedford Square, London, W.C.1.

Royal Statistical Society

Study Circle on Medical Statistics.—On Tuesday, April 26, at 6 P.M., at the Westminster Medical School, Horseferry Road, S.W.1, Dr. J. N. Morris will speak on Hypotheses on Coronary Artery Disease.

Wessex Rahere Club

A dinner of this club will be held at the Royal Clarence Hotel, Exeter, on Saturday, April 30. Membership of the club is open to all Barts men practising in the West Country. Further details may be had from Mr. A. Daunt Bateman, the hon. secretary, 11, The Circus, Bath.

Health Education Summer School

The summer school for 1955 organised by the Central Council for Health Education will be held at Bangor, North Wales, from Aug. 16 to 26. The theme will be Opportunities and Methods in Health Education. Applications should be sent to the medical director of the council, Tavistock House, London, W.C.1.

Orthopædics in Scotland

Since the Scottish Orthopædic Council was set up in 1942 it has distributed on behalf of the Lord Nuffield Fund for Cripples over £24,000 to orthopædic clinics, educational establishments for cripple children, and other aids to cripples in Scotland. In addition the Nuffield trustees have made grants of £26,500 for hospital developments at Philipshill, Busby, and Princess Margaret Rose Hospital in Edinburgh. The council has now agreed to dissolve since "orthopædic services were now firmly established in all five regions of Scotland, and therefore the work for which the Council had been formed had been accomplished." As part of the winding up process the Nuffield trustees have agreed with the council to allocate £15,000 for the erection of occupational therapy and workshop departments at the proposed spinal-injuries unit at Edenhall, Musselburgh, and to make a grant of £2000 towards the extension of the residential training establishment for severely handicapped girls at Anton House, Broughty Ferry.

Doctors and the Press

At an exploratory meeting between representatives of the Press organisations and the medical profession, held at British Medical Association House on March 29, it was decided to set up a committee to examine the relations between the Press and the medical profession, and to formulate proposals for further consideration. The following doctors were appointed to the committee: Dr. H. Guy Dain, Sir Harold Boldero, Dr. R. Forbes, Dr. F. Gray, Dr. J. G. M. Hamilton, Mr. J. R. Nicholson-Lailey, Dr. A. Talbot Rogers, and Dr. W. Woolley. The first meeting will be held on Wednesday, April 27.

Diary of the Week

APRIL 10 TO 16

Wednesday, 13th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
4.30 P.M. *Physical Medicine.* Dr. E. J. Crisp, Dr. J. H. Cyriax, Dr. Basil Christie: Treatment of Backache by Traction.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. A. I. G. McLaughlin: Dust Diseases in British Industry.

HARVEIAN SOCIETY OF LONDON, 11, Chandos Street, W.1
8.15 P.M. Sir Adolphe Abrahams, Sir Arthur Porritt, Dr. Roger Bannister: Medical Aspects of Athletics.

ASSOCIATION OF CLINICAL PATHOLOGY
2 P.M. (Palais de Danse, Douglas, Isle of Man.) Opening lecture of four-day meeting.

Thursday, 14th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* Dr. W. R. Bett, Prof. Frank Goldby, Mr. L. C. Oliver, Dr. Hugh Garland. In commemoration of James Parkinson (1755–1824).

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, S.E.5
5.30 P.M. Prof. H. McIlwain: Maudsley, Mott, and Mann on the Chemical Physiology and Pathology of the Mind.

Friday, 15th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Epidemiology and Preventive Medicine.* Dr. Ira V. Hiscock (Yale): Changing Concepts in the Control of Tuberculosis in the United States.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. William McKenzie: Surgical Treatment of Deafness.

BIOCHEMICAL SOCIETY
11 A.M. (University of Liverpool.) Opening of two-day meeting with the Association of Clinical Biochemists.

Appointments

CANNON, P. G., M.B. St. And., D.P.H.: asst. county M.O. and M.O.H., borough of Beccles, the Bungay, Halesworth, and Leiston urban districts, and the Blyth and Wainford rural districts.

HOPKINS, G. B., M.B. Birm., D.P.H.: asst. M.O. and district M.O.H., area No. 7 (Downham urban district, Downham rural district and Marshland rural district), Norfolk County Council.

INGHAM, MARGARET, M.B. Birm., D.C.H.: asst. M.O.H., Wolverhampton.

MAKEY, A. R., M.S. Lond., F.R.C.S.: part-time asst. surgeon, Charing Cross Hospital, London.

OWEN, KENNETH, M.B. Lond., F.R.C.S.: asst. director, surgical unit, St. Mary's Hospital Medical School, London.

SCHURR, P. H., M.B. Camb., F.R.C.S.: neurosurgeon, Guy's-Maudsley Neurosurgical Unit, Maudsley Hospital, London.

SLEIGH, JOHN, M.B. Aberd., D.P.H.: deputy M.O.H., deputy principal school M.O., and deputy port M.O., Newport, Monmouthshire.

SYLVESTER, D. G. G., M.D. Lond.: resident M.O., the Middlesex Hospital, London.

East Anglian Regional Hospital Board:

CULLIGAN, J. D., L.R.C.P.I.: anæsthetic registrar, East Suffolk and Ipswich Hospital.

ESSEX, LUDLOW, M.R.C.S.: anæsthetic registrar, West Norfolk and King's Lynn General Hospital.

JATOI, A. M., M.B. Bombay: surgical registrar, West Norfolk and King's Lynn General Hospital.

Colonial Medical Service

FAWKES, M. A., M.B. Camb., D.P.H.: M.O.H., Federation of Nigeria.

HENNESSY, D. B. E., M.R.C.S.: resident M.O., Kenya.

HOPWOOD, B. E. C., M.R.C.S.: senior M.O., Uganda.

JOHNSON, ELIZABETH E., M.R.C.S., D.T.M. & H.: M.O., Sierra Leone.

KOCH, A. B. P. H., M.D.: M.O., Gold Coast.

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PANIKKAR, M. K., M.R.C.S.: district M.O., Windward Islands.

ROSS, C. M., M.B. Glasg., F.R.F.P.S.: specialist (leprologist), Northern Region, Nigeria.

SANTOS, W. A., L.R.C.P.I.: superintending M.O. (specialist), Trinidad.

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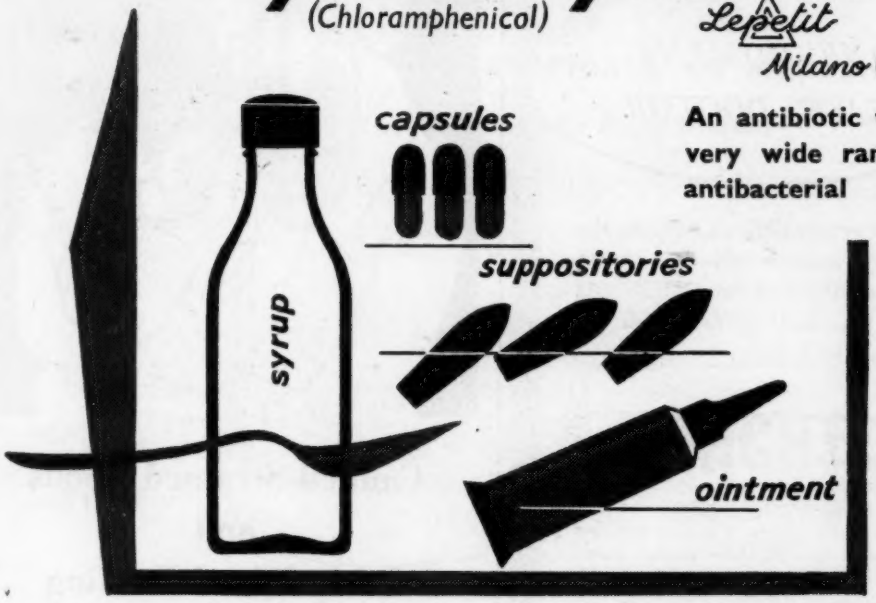

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2.00 P.M. Introduction: Clinical Organisation of the Treatment of Injuries — Mr. WILLIAM GISSANE
3.00 P.M. Emergency Treatment of Major Injuries — Mr. RUSCOE CLARKE
4.30 P.M. Principles of the Treatment of Major Burns

Tuesday, 10th May

10.00 A.M.–11.00 A.M. / 11.30 A.M.– 1.00 P.M. Discussion on the Treatment of Closed Fractures — Mr. WILLIAM GISSANE / Mr. F. G. BADGER
2.00 P.M. Ward Demonstration of the Treatment of Fractures
3.00 P.M. Problems in the Union of Fractures — Mr. J. H. HICKS

Wednesday, 11th May

10.00 A.M. Abdominal Injuries .. .. — Mr. P. S. LONDON
11.30 A.M. Tour of the Hospital
2.00 P.M. Shock, Hæmorrhage and the Illness of Trauma — Mr. RUSCOE CLARKE
3.15 P.M. General and Local Treatment of Burns
4.45 P.M. Demonstration: Blood Volume and Other Studies in Burns and Trauma — Dr. E. TOPLEY

Thursday, 12th May

10.00 A.M. Head Injuries .. .. .. — Mr. J. M. SMALL
11.30 A.M. Thoracic Injuries .. .. — Mr. A. L. D'ABREU
2.00 P.M. Treatment of Major Wounds — Mr. P. S. LONDON
3.00 P.M. Treatment of Open Fractures — Mr. F. G. BADGER
4.30 P.M. Demonstration : Bacteriology of Trauma — Dr. E. J. L. LOWBURY

Friday, 13th May

10.00 A.M. Shoulder Injuries .. .. — Mr. H. PROCTOR
11.30 A.M. Fractures in the Aged — Mr. WILLIAM GISSANE
2.00 P.M. Class Discussion

The fee for the Course (including lunch and tea) is 7 guineas, payable to the Institute of Accident Surgery.

Applications should be sent to and further particulars obtained from the Secretary, Institute of Accident Surgery, Birmingham Accident Hospital, Bath-row, Birmingham, 15.

L.M.S.S.A.

FINAL EXAMINATION : SURGERY, 9th May, 13th June, 11th July, 1955. MEDICINE, PATHOLOGY, 16th May, 20th June, 18th July, 1955. MIDWIFERY, 17th May, 21st June, 19th July, 1955. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

UNIVERSITY OF BRISTOL. Applications are invited from registered medical practitioners for the new post of LECTURER IN FORENSIC PATHOLOGY in the University Department of Pathology. The duties include instruction in forensic medicine to medical students, and the conduct of autopsies, with special responsibility for those of medico-legal importance for the Coroner and Police. The terms and conditions of the appointment will be those appropriate to a Clinical Lecturer with special responsibilities, and the commencing salary will be not less than £2400 a year. All fees received are to be paid to the University.

Applications, with the names of 3 referees, should be made to the undersigned, from whom further particulars may be obtained, not later than 16th May, 1955.

H. C. BUTTERFIELD, Registrar and Secretary.

UNIVERSITY OF LONDON. The Senate invite applications for the CHAIR OF ANATOMY tenable at Guy's Hospital Medical School (salary not less than £2250 a year).

Applications (10 copies) must be received not later than 16th May, 1955, by the Academic Registrar, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF OXFORD. Applications are invited from senior medical men having administrative experience for the appointment of a DIRECTOR OF POSTGRADUATE MEDICAL STUDIES as from 1st October, 1955. The salary will be in the range of £1200–£1500. The Director will hold office for 5 years but will be re-eligible subject to retirement at the age of 67. The person appointed will be required to become a member of the F.S.S.U. and an allowance of £50 p.a. for each dependent child is payable.

Applications (6 copies), with a statement of age, degrees, qualifications, professional and administrative experience, and the names of 3 referees, should be sent to the Secretary of Faculties, University Registry, Oxford, from whom further particulars can be obtained, not later than 1st May, 1955.

THE UNIVERSITY OF LIVERPOOL. Applications are invited from medically qualified candidates for the post of ASSISTANT LECTURER in the Department of Physiology. The initial salary will be £700 p.a., rising by annual increments of £100 to £900 p.a. Duties of the post will commence on 1st August, 1955, or on a date to be arranged.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 16th April, 1955, by the undersigned, from whom further particulars of the conditions of appointment may be obtained.

STANLEY DUMBELL, Registrar.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for a post of LECTURER or ASSISTANT LECTURER IN PHYSIOLOGY to begin duties on 1st October, 1955. Salary scales : (*a*) for candidates holding a registered medical qualification—Lecturer, £800–£100–£1700 ; Assistant Lecturer, £700–£50–£800 ; (*b*) for other candidates—Lecturer, £650–£50–£1350 ; Assistant Lecturer, £550–£50–£650. Commencing salary in either grade according to qualifications and experience, with F.S.S.U. provision and family allowance.

Applications (6 copies) should be sent to the Registrar, from whom further particulars may be obtained, by 7th May, 1955.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for a post of SENIOR LECTURER or LECTURER IN PHYSIOLOGY to begin duties as soon as possible. Salary scales : (*a*) for candidates holding a registered medical qualification—Senior Lecturer, £1750–£100–£2050 ; Lecturer, £800–£100–£1700 ; (*b*) for other candidates—Senior Lecturer, £1400–£50–£1650 ; Lecturer, £650–£50–£1350. Commencing salary in either grade according to qualifications and experience, with F.S.S.U. provision and family allowance.

Applications (6 copies) should be sent to the Registrar, from whom further particulars may be obtained, by 7th May, 1955.

THE INSTITUTE OF LARYNGOLOGY AND OTOLOGY (UNIVERSITY OF LONDON), 330/332, Gray's Inn-road, W.C.1. FIRST ASSISTANT to the Professorial Unit. Applications are invited for this post with effect from 1st June, 1955. A higher qualification in surgery is required and candidates must have held an Oto-laryngological Registrarship in a teaching hospital. The post is a full-time one tenable for an initial period of 1 year, subject to annual re-election thereafter, and the successful applicant will be given honorary rank as a Senior Registrar at the associated Royal National Throat, Nose and Ear Hospital. Salary within the range £1200–£1500 with superannuation benefits, the commencing salary being determined according to experience and particularly any previous service in the Senior Registrar grade. Family allowances on the University scale are payable.

Applications in triplicate, giving full particulars of age, qualifications and experience and accompanied by the names of 2 referees, should be sent to the Secretary not later than 30th April.

Hospital Services : Senior Appointments

CHARING CROSS HOSPITAL, W.C.2. Part-time ANÆSTHETIST (Consultant). 3 attendances per week.

Candidates, who should specialise in anæsthetics and have the D.A. and the F.F.A.R.C.S., should submit 12 copies of their applications, stating date of birth, qualifications and experience, with the names of 3 referees, to reach the undersigned by 30th April, 1955.

FRANK HART,
House Governor and Secretary to the Board.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT PHYSICIAN (whole-time) with main interest in geriatrics, Bedford General Hospital (437 Beds) and Clapham, Biggleswade and Steppingley Hospitals (chronic beds totalling 173). Experience in rheumatology and physical medicine an advantage.

Applications by 16th May, 1955.

(2) CONSULTANT ANÆSTHETIST, 1 half-day a week (Wednesday morning), Marie Curie Hospital, 66, Fitzjohn's-avenue, N.W.3 (50 Beds).

Applications by 20th May, 1955.

Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of Part-time CONSULTANT ANÆSTHETIST. Duties to commence 1st October, 1955.

Applications, giving the names of 3 referees, should be forwarded to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, London, W.C.1, not later than 2nd May, 1955.

BIRMINGHAM REGIONAL HOSPITAL BOARD.
Coventry and Birmingham (Dudley Road) Groups
CONSULTANT RADIOTHERAPIST, Coventry and Warwickshire Hospital (5 notional half-days), Dudley Road Hospital, Birmingham (6 notional half-days). Wide experience and higher qualification essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 25th April, 1955.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. COLCHESTER CHEST CLINIC. Locum ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade) required. The post is full-time, resident or non-resident. Fully equipped modern clinic, with duties in tuberculosis wards at Myland Hospital.

Applications, stating date available, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester, Essex.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT RADIOLOGIST (whole-time) at Hospitals in the Peterborough and Stamford Area. Duties mainly at Peterborough Memorial Hospital where there is a new and fully equipped X-ray Department. Wide experience and higher qualification necessary. Salary scale £1500–£1950.

Applications (8 copies), stating age, experience, and the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 25th April, 1955. Candidates invited to visit the hospitals concerned by direct arrangement with Hospital Management Committee Secretary, Memorial Hospital, Peterborough.

MANCHESTER REGIONAL HOSPITAL BOARD.
(*a*) CONSULTANT ANÆSTHETIST, Royal Manchester Children's Hospital, Pendlebury, and Salford Royal Hospital. Whole-time for minimum of 3 years, when Board will consider application for maximum part-time employment. Higher qualification in anæsthetics essential, successful candidate to live in or near Salford. 25th April, 1955.

(*b*) Maximum Part-time CONSULTANT THORACIC SURGEON from 1st November, 1955, for Regional Thoracic Surgery Service based on Manchester. Main centres at Baguley Sanatorium, Manchester, and Park Hospital, Davyhulme. Good general and thoracic surgery training and experience essential. Appointee to live in or near Manchester. 5th May, 1955.

(*c*) Whole-time NON-RESIDENT ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer) to the West Manchester Hospital Centre, based on the Group Laboratory at Park Hospital, Davyhulme, near Manchester. Experience in all branches of hospital pathology desirable. Successful candidate will work under general guidance of a Consultant. 30th April, 1955.

Application forms from the Senior Administrative Medical Officer of the Board, Cheetwood-road, Manchester, 8, to be returned by dates stated.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of Full-time SENIOR HOSPITAL MEDICAL OFFICER (non-resident). Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications, giving details of past experience and qualifications, together with the names of 3 referees, to be addressed to the undersigned as early as possible. (Special application forms can be obtained on request.)

F. J. CABLE, Secretary, United Manchester Hospitals.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the whole-time post of ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) to the Fair Mile Hospital, near Wallingford, Berks, and its associated clinics, as a member of the area team. Single accommodation is available. Candidates should hold the D.P.M. or its equivalent and must have had considerable experience of psychiatry. Applicants are invited to visit the hospitals by arrangement with the Physician-Superintendent.

Applications (10 copies), stating age, qualifications, and experience, with the names and addresses of 3 referees, should reach the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, by 29th April, from whom further particulars are available.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time ASSISTANT ANÆSTHETIST in the grade of Senior Hospital Medical Officer, to the hospitals of Northampton and District Hospital Management Committee. Applicants should hold the D.A. The successful candidate will be required to reside in or near Northampton General Hospital. Applicants are invited to visit the hospitals by arrangement with the Secretary, Northampton General Hospital.

Applications (10 copies), stating age, qualifications, experience, and the names and addresses of 3 referees, should reach the Secretary of the Board, 43, Banbury-road, Oxford, by 30th April.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ASSISTANT PSYCHIATRIST for the Pastures Hospital, Mickleover, near Derby. Salary scale £1500–£50–£1950.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Form to be returned by 30th April, 1955.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT RADIOTHERAPIST for the Sheffield National Centre for Radiotherapy. Candidates should be in possession of the D.M.R.(T). The successful applicant will work under the direction of the Medical Director. Salary scale £1500–£50–£1950.

Application forms and further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 30th April, 1955.

SHEFFIELD REGIONAL HOSPITAL BOARD. Regional BLOOD TRANSFUSION CENTRE, Northfield-road, SHEFFIELD, 10. Whole-time NON-RESIDENT MEDICAL OFFICER required with previous clinical and laboratory experience, to work under the supervision of the Director. Salary scale : £1500–£50–£1950. Duties mainly concerned with the development of immunohæmatology in its laboratory and clinical aspects, but will also include participation in the routine work of the Centre. The post will provide excellent opportunities for original work.

Application forms and further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Forms to be returned by 7th May, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments:—

ASSISTANT NEUROSURGEON (Consultant grading) for duties at Killearn Hospital, Stirlingshire, and elsewhere as may be determined. The appointment will be whole-time or on the maximum part-time basis of 9 notional half-days per week. The successful applicant will require to enter upon the duties of the post on 1st October, 1955.

Whole-time ASSISTANT E.N.T. SURGEON based at the Ear, Nose and Throat Hospital, Glasgow. Salary (at age 32 and over) on the scale £1500–£50–£1950.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment of OPHTHALMOLOGIST (Senior Hospital Medical Officer grade), on a whole-time or maximum part-time basis, for duty at the Royal Infirmary of Edinburgh.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 30th April, 1955.

WELSH REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) at Cefn Coed Hospital, Swansea (710 Beds). Modern treatments. Adult psychiatric outpatient clinics. Resident/non-resident.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as SECOND CONSULTANT RADIOTHERAPIST at the Northern Ireland Radiotherapy Centre, Purdysburn, Belfast. The terms and conditions will be in accordance with the Authority's application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 26th April, 1955.

PERSIAN GULF. DOHA HOSPITAL, Qatar State, PERSIAN GULF. Applications are invited for the post of ANÆSTHETIST to this 100-bed air-conditioned State Hospital. Qualifications D.A. or F.F.A.R.C.S. essential. Besides anæsthetics some medical work inside Hospital. Ability to speak Arabic or Persian an asset. Salary, Indian Rupees 2700 per month with annual increment of Rs.100 per month to Rs.3200 per month (approximately equivalent to £2412–£90 p.a.–£2865 p.a.). No income-tax, but high cost of living. Free fully furnished accommodation, fuel, light and water. Car allowance to cover purchase and running costs of car used on official duties. Agreement 5 years with annual leave 2 months. Free passages for doctor, wife and 3 children. Climate Qatar pleasant 7 months, hot and sticky 5 months, this disadvantage offset by air conditioning and annual leave.

Applications, giving details of training, qualifications, experience, age, nationality, marital status, 3 copies of testimonials and photograph, should be sent by air-mail to State Medical Officer, Doha, Qatar State, Persian Gulf.

Hospital Services : Junior Appointments

BATTERSEA GENERAL HOSPITAL, S.W.11. House PHYSICIAN (residence optional), vacant early May. Not pre-registration.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE SURGEON (resident), vacant 18th May. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 25th April, 1955.

BRITISH HOSPITAL FOR MOTHERS AND BABIES, Samuel-street, Woolwich, S.E.18. SENIOR HOUSE OFFICER (obstetrics), vacant 2nd May. Recognised for M.R.C.O.G. 6 months appointment and may be renewed for a further period. Salary £745, less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

BROMPTON HOSPITAL, S.W.3. Applications are invited for the post of ANÆSTHETIC REGISTRAR (full-time). The appointment is for 1 year with eligibility for re-appointment.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 14th April, to KENNETH A. F. MILES, House Governor.

BROMPTON HOSPITAL, S.W.3. Applications invited for post of SURGICAL REGISTRAR (whole-time). The appointment is for 1 year with eligibility for reappointment. Candidates must hold the Diploma of F.R.C.S.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 14th April, to KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in General Surgical Department. Appointment for 6 months from 1st June 1955. Pre-registration candidates will be considered.

Applications, with copies of 2 testimonials, to Medical Director by 16th April, 1955.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in General Medical Department, including neurology. Appointment for 6 months from 1st May, 1955.

Applications, with copies of 2 testimonials, to Medical Director by 16th April, 1955.

COLINDALE HOSPITAL, Colindale-Avenue, London, N.W.9. (Tuberculosis only—300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (whole-time), resident or non-resident, required in the Thoracic Surgical Unit. Hospital may be visited by direct appointment with Physician-Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 23rd April, 1955.

EAST END MATERNITY HOSPITAL, 384-398, Commercial-road, London, E.1. (60 Beds. Posts recognised for M.R.C.O.G.)

RESIDENT SENIOR OBSTETRICAL OFFICER (Senior House Officer) required for 1 year.

RESIDENT OBSTETRICAL OFFICER (House Officer third post) required for 6 months.

Posts vacant 1st May, 1955.

Applications, with copies of testimonials, to the Secretary, Stepney Group Hospital Management Committee, Raine-street, Wapping, E.1.

EASTERN HOSPITAL (Fevers), London, E.9. House OFFICER (third post), now vacant. Duties may include some work in Chest Unit. Facilities for Postgraduate study for higher qualifications.

Applications, with testimonials, to Group Secretary, Hackney Hospital, E.9, by 23rd April, quoting EH/HO.

KING EDWARD MEMORIAL HOSPITAL, Ealing. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) for duties at King Edward Memorial Hospital and associate Hospitals. Resident. Vacant 1st May, 1955. A Resident Registrar Anæsthetist is employed. Post recognised for D.A. and F.F.A.R.C.S. examinations.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 19th April, 1955.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited for appointment as RESIDENT CASUALTY OFFICER, vacant 1st May, 1955. The position is graded as Senior House Officer or House Officer, according to experience, recognised for the F.R.C.S.

Forms of application from the Physician-Superintendent on receipt of a stamped addressed envelope.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) at above Hospital, vacant 23rd May, 1955. Previous experience in pathology not essential. Opportunities are presented for gaining experience in all branches of clinical pathology.

Form of application from the Secretary to be returned not later than 23rd April, 1955.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. 2 vacancies occur 1st June, 1955, for RESIDENT HOUSE PHYSICIAN. Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and posts are graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic as well as in wards.

Applications, stating age, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 23rd April.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON JEWISH HOSPITAL, Stepney Green, E.1. (130 Beds.) HOUSE SURGEON (pre- or post-registration) required for 6 months commencing 5th May, 1955.

Applications, with copies of testimonials, to be sent to the Hospital Secretary.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the posts of RESIDENT MEDICAL OFFICER, and HOUSE PHYSICIAN (resident) at Maida Vale Hospital for Nervous Diseases, London, W.9. Appointments in the first instance for 6 months, renewable. Grading as Senior House Officer or Registrar according to experience. Preference will be given to candidates holding a higher degree, and previous neurological experience will be an asset.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary at Maida Vale Hospital, not later than 30th April, 1955.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar.

Applications, giving the names of 3 referees, to be sent to the undersigned not later than 23rd April, 1955.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospital, Queen-square, W.C.1.

PLAISTOW HOSPITAL, Samson-street, London, E.13. Applications are invited for appointment of SENIOR HOUSE OFFICER (resident) to the Chest Unit and Infectious Diseases Unit at the above Hospital for 12 months. Previous experience in diseases of the chest is desirable. Excellent experience is afforded in the investigation of chest and infectious diseases cases and there are good facilities for postgraduate study for the M.R.C.P. examination.

Applications, with copies of recent testimonials, to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 23rd April, 1955.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR CASUALTY OFFICER, for a period of 6 months, vacant 4th June, 1955.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 23rd April, 1955.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR HOUSE SURGEON, for a period of 6 months, vacant 14th May, 1955.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 23rd April, 1955.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON (third post), for a period of 6 months, vacant 2nd June, 1955.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 23rd April, 1955.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from qualified medical practitioners for appointment as RESIDENT JUNIOR HOUSE SURGEON for Casualty (pre-registration first or second post) for a period of 6 months, vacant from 7th May, 1955.

Application form from the Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, N.15, to be returned by 23rd April, 1955.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. BERNHARD BARON MEMORIAL RESEARCH LABORATORIES. A REGISTRAR will be required in April at the above Laboratories. Previous specialised experience is not essential. The successful candidate will receive training in serology and bacteriology, and may later assist in the research work. The post is resident.

Applications to the House Governor to the Board of Governors by 18th April, 1955, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. HOUSE PHYSICIAN (Male or Female; third post), for 6 months commencing 6th May, 1955.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 16th April, 1955.

ROYAL MARSDEN HOSPITAL, Fulham-road, S.W.3. Applications are invited for the post of Full-time SENIOR REGISTRAR in the Radiotherapy Department to commence duty as soon as possible. Candidates should hold a Diploma in Medical Radiology.

Forms of application are obtainable from the House Governor to whom applications, together with names of 3 referees, should be sent by 2nd May.

ST. JAMES' HOSPITAL, Balham, S.W.12. South West METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (orthopædic and trauma). Post vacant 1st July. Recognised for F.R.C.S.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned by 23rd April.

ST. PETER'S AND ST. PAUL'S HOSPITALS. Vacancies exist for Honorary CLINICAL ASSISTANTS on Monday, Tuesday, Wednesday, and Thursday afternoon Outpatient Clinics.

Apply: House Governor, Henrietta-street, W.C.2.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON at above Hospital, vacant in June, 1955, for 6 months. Recognised for M.R.C.O.G.

Application forms from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of OBSTETRIC HOUSE SURGEON at above Hospital. Post recognised for the M.R.C.O.G. Appointment for 6 months from 4th July, 1955.

Forms of application from the Secretary.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT MEDICAL OFFICER to fill a vacancy in the approved establishment at the Seamen's Group of hospitals. The successful candidate will be required to reside at the Dreadnought Seamen's Hospital, Greenwich, S.E.10. The salary will be £965 p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 23rd April, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Thoracic Surgery for duty at the Regional Unit at the Brook General Hospital, Shooters Hill, S.E.18, and also at Grove Park Hospital, Marvels-lane, Lee, S.E.12. Duties will include both tubercular and non-tubercular thoracic surgery. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 23rd April, 1955.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 15th July, 1955, for a JUNIOR RESIDENT ANÆSTHETIST (Senior House Officer).

Full particulars, with form of application, which must be returned not later than Monday, 2nd May, 1955, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, 2 SENIOR HOUSE OFFICERS for Pathology (1 non-resident, 1 (Male) resident). Previous clinical experience essential but pathological experience not essential.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

ASHFORD HOSPITAL, Ashford, Middlesex. (600 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Radiology (whole-time, non-resident). Possession of a higher qualification desirable. Successful candidate also required to work at another hospital in the Group. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 19th April, 1955.

BATH. ST. MARTIN'S HOSPITAL. Applications are invited from medical practitioners for the post of HOUSE PHYSICIAN at above Hospital, which is recognised for pre-registration purposes and vacant approximately beginning of June.

Applications, stating age, qualifications and experience, should be forwarded with 3 testimonials, to Group Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath, by 30th April, 1955.

BATH. ROYAL UNITED HOSPITAL. Applications are invited from medical practitioners for the post of HOUSE PHYSICIAN at the above Hospital, which is recognised for pre-registration purposes and vacant early June.

Applications, stating age, qualifications and experience, should be forwarded with 3 testimonials, to Group Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath, by 30th April, 1955.

BATH. ROYAL UNITED HOSPITAL. Applications are invited from medical practitioners for the post of HOUSE SURGEON at the above Hospital. The post is recognised for pre-registration purposes and is vacant at the end of May.

Applications, stating age, qualifications and experience with 3 testimonials, should be forwarded to Group Secretary, Bath Hospital Management Committee, Manor Hospital, Combe Park, Bath, by 30th April, 1955.

BATH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from medical practitioners for the post of HOUSE SURGEON (orthopædic) which is a joint one between the Royal United and Bath and Wessex Orthopædic Hospitals, which are adjacent. Post graded Senior House Officer and offers experience in "cold" orthopædics including children, surgery of arthritis and traumatic surgery.

Applications, stating age, qualifications and experience, with 2 testimonials, should be forwarded to Group Secretary, Manor Hospital, Combe Park, Bath.

BECKENHAM HOSPITAL, Beckenham, Kent. (General —100 Beds.) CASUALTY OFFICER (Senior House Officer) required 20th April for 1 year in first instance, with duties in Orthopædic and Fracture Departments. Recognised for F.R.C.S. Deduction for residence £150.

Apply, stating age, nationality, qualifications, and experience, and naming 3 referees, to Administrative Officer.

BIRMINGHAM, 15. ROYAL ORTHOPÆDIC HOSPITAL. (Long and short term orthopædic cases (non-traumatic), 336 Beds and extensive outpatient services.) SENIOR HOUSE OFFICER—registered medical practitioners, preferably with orthopædic experience.

Applications, with copies of testimonials, to Administrator.

BIRMINGHAM, 18. SUMMERFIELD HOSPITAL, Western-road. JUNIOR HOSPITAL MEDICAL OFFICER required (resident or non-resident), 1000 Beds for elderly and chronic sick and an active geriatric organisation (5 Junior Hospital Medical Officers).

Applications, with copies of 3 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM (SANATORIA) GROUP HOSPITAL MANAGEMENT COMMITTEE. YARDLEY GREEN HOSPITAL. THORACIC SURGICAL UNIT. Applications are invited for the post of SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. The appointment will give broad opportunities for experience in both tuberculous and non-tuberculous thoracic surgery.

Applications, stating age, qualifications, training, and experience, together with copies of 3 recent testimonials, should be addressed to the Group Secretary, Yardley Green Hospital, Birmingham, 9.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. Required, SENIOR HOUSE OFFICER or HOUSE OFFICER (including pre-registration), according to experience.

Detailed applications, with copies of 2 recent testimonials, to the Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) Shrewsbury Group Hospital Management Committee, Royal Salop Infirmary, Shrewsbury

ORTHOPÆDIC REGISTRAR for The Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry (430 Beds). First year at peripheral centre, Shrewsbury, second year at base hospital, Oswestry.

(2) West Bromwich and District Hospitals Group (No. 18), West Bromwich and District General Hospital, Edward-street, West Bromwich

REGISTRAR in Pathology, for West Bromwich Group. Well-equipped laboratory offering excellent opportunities for comprehensive pathological experience. Recognised for D.Path.

Application forms from Group Secretaries, to be returned before 25th April, 1955. Candidates may visit hospitals.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of ASSISTANT RESIDENT MEDICAL OFFICER (Senior House Officer), vacant 15th August, 1955, for 1 year. Main duty to take charge of Infants Block (66 Cots). Previous hospital experience of diseases of infancy is desirable and preference will be given to candidates holding the M.R.C.P.

Forms of application may be obtained from the House Governor, and should be returned by 23rd April, 1955.

G. A. PHALP, Secretary to the Board of Governors.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTS. (67 Beds—medical, surgical and maternity. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for RESIDENT HOUSE OFFICER (not pre-registration). Appointment to commence 7th May, 1955.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees, should be sent to the Hospital Secretary, Haymeads Hospital, Bishop's Stortford, Herts.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Locum RESIDENT ORTHOPÆDIC REGISTRAR required end of April pending permanent appointment. Salary £17 10s. per week.

Applications, stating age, nationality, qualifications and previous appointments, together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BOWDEN, CHESHIRE. ST. ANNE'S E.N.T. HOSPITAL. (53 Beds.) NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. REGISTRAR required (preferably resident).

Applications to be forwarded, with 2 recent testimonials, to the Group Secretary, The Hospital, Sinderland-road, Altrincham, Cheshire, not later than 22nd April, 1955.

BRADFORD, YORKSHIRE. THE ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for E.N.T. Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. (544 Beds.) Applications invited for post of HOUSE OFFICER (orthopædic surgery). First, second, third or pre-registration post; tenable for 6 months. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRIGHTON. SUSSEX EYE HOSPITAL, Eastern-road, BRIGHTON, 7. (56 Beds.) SENIOR HOUSE SURGEON (Senior House Officer) and HOUSE SURGEON (House Officer) required mid-April. Posts recognised for F.R.C.S. under 23 (b).

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer.

BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL. GENERAL SURGICAL UNIT. Applications are invited for an appointment as HOUSE OFFICER in the General Surgical Unit of Bangour General Hospital, Broxburn, which is 15 miles from Edinburgh. Salary and conditions of service will be in accordance with the regulations.

Applications, giving age, qualifications and particulars of previous experience, if any, should be lodged with the Group Medical Superintendent, Bangour General Hospital, Broxburn, West Lothian.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Pædiatrics. The post is based on Bury General Hospital, but will include duties at other hospitals in the Group.

Apply, stating age, qualifications, experience, and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House PHYSICIAN for 6 months from 2nd June. Recognised Pre-registration Service.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 23rd April. Interviews 29th April.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) The post of GENERAL SURGICAL AND ORTHOPÆDIC HOUSE SURGEON, which is recognised for the F.R.C.S. Diploma, becomes vacant early May, 1955. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) The post of OBSTETRIC HOUSE SURGEON, which is recognised for the M.R.C.O.G. and D.Obst. R.C.O.G., becomes vacant early May, 1955. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration, or third post), which is recognised for the F.R.C.S., is now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post vacant mid-May, 1955. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. ST. DAVID'S HOSPITAL. (656 Beds.) Cardiff HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER required in Accident Unit at above Hospital commencing immediately. Practical experience gained in all types of injury under direction of a Consultant.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). Salary £425, £475 or £525 p.a., according to experience, less £125 p.a. for residential emoluments. Vacancy now.

Applications, stating age, qualifications, experience and nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (pre-registration post). The post will become vacant on 16th April, and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House SURGEON (pre-registration, first, second, or third post). Duties commencing 29th April, 1955. The Hospital deals with a large number of routine and emergency cases. The post is recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications, and experience, together with recent testimonials, should be sent immediately to the Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House PHYSICIAN (pre-registration, first, second, or third post), Male or Female. Appointment commencing 9th May, 1955.

Applications, stating age, nationality, qualifications, and experience, together with recent testimonials, should be received not later than 20th April by the Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. (Recognised for M.R.C.O.G.) RESIDENT GYNÆCOLOGICAL HOUSE SURGEON. Appointment commencing 8th May, 1955. Preference will be given to candidates who intend to obtain the Diploma of Membership of the Royal College of Gynæcologists.

Applications, stating age, nationality, qualifications, and experience, together with recent testimonials, should be received not later than 20th April, 1955, by the Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (188 Beds)
SENIOR HOUSE OFFICER (Casualty and Radiotherapy).
SENIOR HOUSE OFFICER (Casualty and E.N.T.).
Posts tenable for 6 months or 1 year. Recognised for F.R.C.S.

Clacton and District Hospital, Clacton-on-Sea (58 Beds)
SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to the Group Secretary, 14, Pope's-lane, Colchester, Essex.

COLCHESTER (near). BRITISH LEGION SANATORIUM, NAYLAND, COLCHESTER, ESSEX. (207 Beds for treatment of early pulmonary tuberculosis in women.) IPSWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of SENIOR HOUSE OFFICER. No married quarters available. Deduction for residential emoluments £150 p.a.

Applications, with 2 testimonials, to the Physician-Superintendent.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (404 Beds.) ORTHOPÆDIC HOUSE SURGEON required from 23rd April. Senior House Officer or House Officer (Intern) grade. Post recognised for F.R.C.S. or for pre-registration internship. Preference will be given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent as soon as possible.

COTTINGHAM, near HULL. CASTLE HILL SANATORIUM (221 Beds), AND RAYWELL SANATORIUM, near COTTINGHAM (48 Beds). JUNIOR HOSPITAL MEDICAL OFFICER (appointment for 1 year in first instance or locum tenens) also Locum Tenens SENIOR HOUSE OFFICER, to work under supervision of Consultant Chest Physician in Group Sanatoria with Major Thoracic Surgery Unit and mass radiography and laboratory facilities.

Application forms from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (396 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th April, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DERBY CITY HOSPITAL. (260 Beds. Recognised for training in Obstetrics for D.Obst.R.C.O.G. and M.R.C.O.G.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics) required. Appointment for 1 year in first instance. There are 72 obstetric beds at the City Hospital mainly for abnormal cases and 36 beds at the Queen Mary Maternity Home for normal cases.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th April, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DRIFFIELD, YORKSHIRE. NORTHFIELD SANATORIUM. (78 Beds.) SENIOR HOUSE PHYSICIAN, vacant now. Offers experience all branches of tuberculosis within Group, including surgery, M.M.R., and clinics. Time for study. Ex-patients welcome. £165 for full residence.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)
SENIOR HOUSE OFFICER (casualty). Post recognised for F.R.C.S. examination.

Wordsley Hospital, near Stourbridge (478 Beds)
SENIOR HOUSE OFFICER (anæsthetics). Resident. Previous experience house appointments essential. Experience available general surgery, gynæcology, orthopædics, plastic surgery unit.
HOUSE OFFICER (surgical) pre-registration. Apply Group Secretary, The Guest Hospital, Dudley, Worcs.

Applications, stating age, experience, with copies of 3 recent testimonials, to Group Secretary, The Guest Hospital, Dudley, Worcs.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. Appointment of RESIDENT HOUSE PHYSICIAN (third post), vacant 8th May, 1955. General medical duties. 6 months appointment.

Applications, with the names of 2 referees, to the Secretary, Enfield Group Hospital Management Committee.

EPPING. ST. MARGARET'S HOSPITAL. (485 Beds.) RESIDENT SENIOR HOUSE OFFICER (surgery) as Casualty Officer and Orthopædic House Surgeon. Post vacant 15th May, 1955. Recognised training post for F.R.C.S. Busy general hospital with easy access to London. Salary on national scale less deduction for board, lodging, &c.

Applications, with copies of 2 recent testimonials, to the Group Secretary, Epping Group Hospital Management Committee, St. Margaret's Hospital, Epping, Essex, by 22nd April, 1955.

EPSOM, SURREY. LONG GROVE HOSPITAL. Applications are invited for the appointment of :—
JUNIOR HOSPITAL MEDICAL OFFICER (2 years in first instance).
SENIOR HOUSE OFFICER.
This Mental Hospital (2300 Beds) affords opportunities for experience of all modern methods of investigation and treatment. There is an extensive Outpatients Service and facilities are given to study for the D.P.M. (The Hospital is approved for the Conjoint D.P.M.)

Applications, giving personal particulars, qualifications and experience, together with the names and addresses of 2 referees, to be submitted to the Physician-Superintendent.

EDGWARE GENERAL HOSPITAL. (715 Beds.) Resident SENIOR HOUSE OFFICER in Pathology required at above Hospital, vacant 1st May, 1955. Salary £745 p.a. Deduction of £130 p.a. for board, lodging, &c.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 16th April, 1955.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT SENIOR CASUALTY HOUSE OFFICER required at above Hospital. Salary £745 p.a. ; deduction of £155 p.a. for board, residence, &c.

Apply immediately, stating age, nationality, qualifications and experience, together with the names of 2 referees, to Group Secretary, Edgware General Hospital.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT HOUSE PHYSICIAN for Thoracic and Dermatological Departments. Duties to include "taking of acute general medical cases." Post vacant 18th May, 1955. 6 months appointment.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th April, 1955.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) 2 RESIDENT HOUSE SURGEONS for above Hospital. Posts vacant 1st and 14th May, 1955. 6 months appointments. Posts recognised for pre-registration and F.R.C.S. purposes.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th April, 1955.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for above Hospital. Post vacant 23rd May, 1955. Post recognised for M.R.C.O.G. purposes.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th April, 1955.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from pre-registration/registered medical practitioners for the appointment of HOUSE SURGEON, vacant 11th June, 1955.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 16th April, 1955.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (anæsthetics), vacant 1st July, 1955. The post is recognised for the F.F.A. R.C.S. examination.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 23rd April, 1955.

EXETER. WEST OF ENGLAND EYE INFIRMARY. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Ophthalmology. Resident or non-resident. Vacant 1st July, 1955. The post is recognised for the F.R.C.S. examination.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 23rd April, 1955.

GLASGOW ROYAL INFIRMARY. Senior House Officer in General Surgery (Locum). Duties at above Infirmary.

Write, giving 3 names for reference, not later than 14th April, 1955, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Surgery (urology). Duties at above Infirmary.

Write, giving 3 names for reference, not later than 14th April, 1955, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW ROYAL INFIRMARY. Resident House OFFICER in Urological Department. Duties at above Infirmary.

Apply to the Medical Superintendent, Glasgow Royal Infirmary, 84, Castle-street, Glasgow, C.4.

GLASGOW OPHTHALMIC INSTITUTION. Resident HOUSE OFFICER required.

Apply to the Medical Superintendent, Glasgow Royal Infirmary, 84, Castle-street, Glasgow, C.4.

GLASGOW VICTORIA HOSPITALS BOARD OF MANAGEMENT. Ear, Nose and Throat. SENIOR HOUSE OFFICER required (resident Mearnskirk Hospital, Newton Mearns) with duties at Mearnskirk Hospital and Victoria Infirmary, Glasgow.

Applications, with names of 3 referees, should be submitted to the Secretary, 24, St. Vincent-place, Glasgow, C.1.

GODALMING, SURREY. MILFORD CHEST HOSPITAL. (342 Beds.) Applications are invited for a Whole-time SENIOR REGISTRAR in Chest Diseases. Applicants should possess a higher medical degree and have had a wide experience of the medical and surgical treatment of all forms of chest diseases. The Hospital has a large Surgical Unit and all types of thoracic surgery are carried out. Residential accommodation is available for a single person.

Forms of application from the Group Secretary, Group Office, King George V Hospital, Godalming, Surrey, to whom they should be returned not later than 22nd April, 1955.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for casualty duties required 8th April, 1955. Resident post. Recognised by Royal College of Surgeons for Final Fellowship examination. Hours: 9 A.M.–6 P.M. Monday–Friday; 9 A.M.–12 P.M. Saturday. The Hospital possesses a well-equipped medical library.

Applications, with names and addresses of 2 referees, to the Hospital Secretary, Grimsby General Hospital.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. Applications are invited for the post now vacant, of SENIOR HOUSE OFFICER (orthopædic). Locum would be considered.

Applications, with names and addresses of 2 referees, to Hospital Secretary, Grimsby General Hospital.

HASTINGS AND ST. LEONARDS. BUCHANAN HOSPITAL. (94 Beds.) HOUSE SURGEON for gynæcology (28 gynæcological beds). Post, vacant 3rd May for 6 months, is recognised for M.R.C.O.G. Candidates for Pre-registration Service (surgery) can be considered.

Apply, with 3 recent testimonials, to the Hospital Administrator.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.) RESIDENT HOUSE PHYSICIAN required from 1st May. Post is tenable for 6 months and recognised for pre-registration practitioners.

Applications, with copies of 3 testimonials, to the Hospital Secretary as soon as possible.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Junior HOSPITAL MEDICAL OFFICER in Anæsthetics required. Board-residence available.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ST. JOHN'S HOSPITAL. Senior House OFFICER in Geriatrics and General Medicine required. Good facilities for modern method of treating geriatric cases.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HEREFORDSHIRE GROUP. Registrar in General Surgery. Duties mainly at General (154 Beds—71 surgical beds including fracture and orthopædic) and County (310 Beds—40 surgical) Hospitals, Hereford. Recognised for F.R.C.S. Resident.

Application forms from Group Secretary, Victoria House, Eign-street, Hereford, to be returned before 1st May, 1955. Candidates may visit Group hospitals.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £745 p.a., less £130 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 1st June, 1955.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (General —705 Beds.) REGISTRAR—required for Gynæcological and Obstetric Units. Recognised for M.R.C.O.G. Previous experience essential. Candidates may visit Hospital by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Uxbridge, Middx, by 19th April.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Applications are invited for the post of RESIDENT HOUSE SURGEON, now vacant.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator, Lister Hospital, Hitchin, Herts, as soon as possible.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Applications are invited for the post of RESIDENT HOUSE SURGEON at the North Herts Hospital, vacant 26th April, 1955. Recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator, Lister Hospital, Hitchin, Herts.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE SURGEON required 16th–30th May, 1955. Duties include ward work, outpatient clinics and an occasional session on the Casualty Department.

Applications to be sent to the Secretary.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical) at this Hospital, which is approved by the licensing authority for Pre-registration Service. Post vacant towards the end of April.

Applications, giving full particulars, and names of 2 referees, to the Group Secretary, Hospital Management Committee Offices, Newmarket General Hospital, Newmarket, Suffolk.

IPSWICH. BOROUGH GENERAL HOSPITAL, Heath-road, IPSWICH. (270 Beds.) Applications are invited for 2 posts of HOUSE SURGEONS (pre-registration) to General Surgeons vacant on 10th and 27th May, 1955. The posts, which are recognised for the R.C.S. examinations, are normally of 6 months duration, and are of House Officer grade.

Applications, stating age, experience and qualifications, together with copies of recent testimonials, to Hospital Secretary.

IPSWICH. BOROUGH GENERAL HOSPITAL, Heath-road, IPSWICH. (270 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Fracture and Orthopædic Department). The post, which is now vacant is normally of 1 years duration. It is recognised as part of the necessary surgical experience for the Final F.R.C.S.

Applications, stating age, qualifications and experience, together with recent testimonials to the Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (356 Beds.) Applications are invited for the post of SENIOR HOUSE SURGEON to the Fracture and Orthopædic Department. The post is graded Senior House Officer and is recognised for the F.R.C.S. examinations. The Department has 2 Consultants, about 60 beds, and a large outpatient attendance; it offers wide experience.

Applications, stating age, nationality, and experience, together with copies of recent testimonials, to Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (anæsthetics), resident. Post recognised by the Faculty of Anæsthetists.

Applications, stating age, qualifications with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 19th April, 1955.

ILFORD, ESSEX. KING GEORGE HOSPITAL. There will be a vacancy for a HOUSE PHYSICIAN (pre-registration second post) at the above Hospital on 5th May, 1955. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (112 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON at the above Hospital.

Applications, with the names of 3 referees, to the Hospital Secretary.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-on-Thames. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from suitably qualified and experienced officers for the post of MEDICAL REGISTRAR at the above Hospital. The post will become vacant June/July, 1955.

Forms of application are obtainable from the Group Secretary, 35, Coombe-road, Kingston-on-Thames (a foolscap stamped addressed envelope should be enclosed) and the completed forms should be returned to him within 14 days of the appearance of this advertisement.

LEICESTER ISOLATION HOSPITAL AND CHEST UNIT, Groby-road, LEICESTER. (328 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (surgical). Salary £745 p.a., less £150 p.a. residential emoluments. The appointment is tenable for 6 months and may be extended for a further period of 6 months. Experience will be gained in all branches of thoracic surgery including cardiac surgery.

Applications, giving age, qualifications, dates, &c., and copies of 2 recent testimonials, to be forwarded as soon as possible to the Department of Thoracic Surgery, Leicester Isolation Hospital and Chest Unit.

LEICESTER (near). CARLTON HAYES MENTAL HOSPITAL, NARBOROUGH, LEICESTER. LEICESTER NO. 4 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required for above Hospital (recognised for training for D.P.M.). Residential accommodation for single person (house may become available for married man).

Apply, giving age, qualifications, experience, and names of 3 referees, to Medical Superintendent immediately.

LIVERPOOL. BOOTLE HOSPITAL. Resident Casualty OFFICER required from 1st May, 1955. Junior Hospital Medical Officer grade.

Apply to Secretary, Walton Hospital, Liverpool, 9.

LEEDS, 2. PUBLIC DISPENSARY AND HOSPITAL. LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER (Senior House Officer) at the above Hospital. The appointment will be for a period of 1 year. Salary in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, with an appropriate deduction in respect of board, lodging &c.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.
Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the following REGISTRAR posts.

Anæsthetics

Halifax Group (resident). 2 main hospitals with aggregate of 300 Beds in the surgical specialties.

Chest Diseases

Castle Hill Sanatorium, Cottingham, East Yorks (220 Beds) (resident).

General Surgery

Harrogate and District General Hospital (50 Beds) (resident).

Infectious Diseases

Leeds Road Hospital, Bradford (120 I.D. Beds) (resident).

Ophthalmology

(*a*) Halifax and Bradford A Groups. Duties divided equally between Halifax Group (11 eye beds—1800 new outpatients annually) and Bradford A (34 eye beds—5800 new outpatients annually).

(*b*) St. James's Hospital (22 eye beds—5600 new outpatients annually) and the Public Dispensary, Leeds (non-resident).

Orthopædic Surgery

Woodlands Orthopædic Hospital, Rawdon (100 Beds), and Orthopædic Outpatient Department, Bradford Royal Infirmary. Offers excellent training in all branches of accident and orthopædic surgery (may be non-resident).

Psychiatry

Oulton Hall Hospital, near Wakefield, and affiliated Mental Deficiency Colonies (aggregating 780 Beds) (non-resident). Facilities for attendance at the Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 21st April, 1955.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. SENIOR REGISTRAR, or REGISTRAR, required for Medical Professorial Unit. The post will be for 1 year in the first instance. Terms and conditions of service of hospital medical staff apply.

Applications, giving details of age, qualifications, and experience with dates, with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, not later than 27th April, 1955.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. NEUROLOGICAL HOUSE SURGEON (pre-registration) required for 6 months from 1st May, 1955. Whitley Council conditions of service apply.

Applications, giving details of age, qualifications and experience, if any, with 2 names for reference, should be sent to the Secretary to the Board as soon as possible.

LEIGH INFIRMARY, Leigh, Lancashire. (102 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) for duties at the above and other hospitals in the Group. The post which is tenable for 1 year will be resident, and is recognised for the D.A. and F.F.A.R.C.S. examinations. Wide experience in all branches of anæsthesia is available and there are particular facilities for experience in major thoracic and orthopædic work.

Applications, with names of 2 referees, to undersigned as soon as possible.

T. W. HURST, Secretary,
Wigan and Leigh Hospital Management Committee.
Knowsley House, Wigan.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maidenhead. Applications invited from fully registered practitioners for post of HOUSE PHYSICIAN, vacant 1st June.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to Hospital Secretary.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant April, 1955. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S., and the D.L.O. Salary will be £745 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MANCHESTER. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Locum MEDICAL REGISTRAR. Duties at the Manchester Chest Clinic—a large clinic serving the Greater Manchester Area—and at the Baguley Hospital.

Applications to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, as soon as possible.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for SENIOR HOUSE OFFICER post. Salary £745 p.a., less £155 p.a. for residential emoluments.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE.

Park Hospital, Davyhulme (General Hospital—433 Beds)

1 HOUSE OFFICER (pædiatrics), post-registration, for newly created post. The Hospital has a Midwifery Unit of 73 Beds and there are also thoracic surgery beds on the Pediatric Unit. Hospital recognised for training for Diploma in Child Health.

Eccles and Patricroft Hospital (General Hospital—48 Beds)

1 HOUSE OFFICER (post-registration). Post vacant 1st May, 1955. Additional allowance of £50 p.a. The work of the Hospital is mainly surgical and there is a busy outpatient Department.

Forms from Secretary, Park Hospital, Davyhulme.

MANCHESTER. WYTHENSHAWE HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts at the above Hospital.

(1) RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade).

(2) RESIDENT SENIOR HOUSE OFFICER (surgical).

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded immediately to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER REGIONAL HOSPITAL BOARD. Blackburn AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT REGISTRAR (obstetrics/gynæcology) required. Post recognised for M.R.C.O.G. Based on Queen's Park Hospital, Blackburn (a general hospital with 83 obstetrics/gynæcology beds) with duties at Blackburn Royal Infirmary and Accrington Victoria Hospital. Accommodation for married man and small family available if required.

Application forms obtainable from, and returnable to, the Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

MANCHESTER REGIONAL HOSPITAL BOARD. Bury AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of REGISTRAR in Orthopædics, based at Bury General Hospital.

Apply, stating age, qualifications, experience, and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD. Bury AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the post of REGISTRAR in General Medicine. National scale and conditions.

Apply, stating age, qualifications, experience, and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD. Salford ROSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of NON-RESIDENT REGISTRAR to the Neurosurgical Department at Salford Royal Hospital and the Royal Manchester Children's Hospital. In addition to adult work, the post offers exceptional opportunities for experience in pædiatric neurosurgery.

Applications to the Group Secretary, Salford Royal Hospital, Salford, 3, before 16th April, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications from registered practitioners for the post of REGISTRAR in Plastic Surgery at the Wythenshawe Hospital, which is a General Hospital with 75 plastic surgery beds.

Applications, stating age, qualifications, present post, and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MIDDLESBROUGH. WEST LANE HOSPITAL. (Infectious Diseases and Tuberculosis—229 Beds.) Applications are invited for the appointment of RESIDENT MEDICAL OFFICER for a period to be agreed. Salary appropriate to grade of Junior Hospital Medical Officer, viz., £775–£50–£1075 p.a.

Applications, stating age, nationality, qualifications, previous experience, and names of 3 referees, to be sent immediately to the Physician-Superintendent at the above Hospital.

NEWPORT, MONMOUTHSHIRE. ST. WOOLOS HOSPITAL. (379 Beds.) SENIOR HOUSE OFFICER (general surgery) required, non-resident. The post is of a senior character, covering 56 Beds with the Consultant (engaged solely here) and a House Surgeon. Good opportunity for further practical experience.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

NEWPORT, MONMOUTHSHIRE. ROYAL GWENT HOSPITAL. (260 Beds. 10 Residents. Recognised F.R.C.S.) SENIOR HOUSE OFFICER required for Casualty Department in early April. This is the base Hospital in the Group and all medical and surgical emergencies are admitted through casualty, which is under the full-time charge of a Senior Hospital Medical Officer, there being also 2 Senior House Officers. A new Department with excellent facilities and accommodation has recently been opened. Post recognised F.R.C.S. for 6 months and tenable 6 or 12 months as desired. Salary £745, less £125 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

NEWTON ABBOT HOSPITAL. (General Section 65 Beds.) RESIDENT SENIOR HOUSE SURGEON (Male or Female) required immediately. Married quarters available.

Applications (quoting reference F.364/28), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (resident) required 1st July, 1955, for 1 year in the first instance at the North Herts Hospital, Hitchin, Herts (where he will reside), and the Lister Hospital, Hitchin. Post recognised for F.R.C.S. The hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, by 22nd April, 1955.

NORTHAMPTON. ST. CRISPIN HOSPITAL, Duston, NORTHAMPTON. (1210 Beds.) SENIOR HOUSE OFFICER required. Salary according to national scale. A well-appointed flat is available at the Hospital at moderate rental. The Hospital is approved for training for the D.P.M. of the Conjoint Board and facilities are available in child psychiatry and out-patient clinics locally, and in neurology (at Oxford). There is a modern admission unit and an annual admission rate of 700 patients. Regular case conferences are held.

Applications, giving full details and names of 3 referees, to be sent to the Physician-Superintendent.

NORWICH. HELLESDON HOSPITAL. East Anglian REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry at above Hospital. Associated with this modern mental hospital (960 Beds) are a separate early treatment hospital with an Electro-encephalograph Department, outpatient clinics for both adults and children, and a special unit for the elderly mentally infirm. Modern house available. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 25th April, 1955. Candidates are invited to visit Hospital by direct arrangement with the Medical Superintendent.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for 2 SENIOR CASUALTY HOUSE OFFICERS (establishment 3). Salary and conditions of service in accordance with Ministry regulations. Duties to commence as soon as possible. These posts offer wide experience of casualty work.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to the Secretary, General Hospital, Nottingham.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the non-resident post of REGISTRAR in Dermatology, vacant 1st June, 1955. The appointment will be for 1 year and eligible for extension to 2 years.

Applications on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should reach him by 18th April.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Queen Alexandra Hospital

SENIOR HOUSE OFFICER, E.N.T. Department (61 Beds), vacant now.

Saint Mary's Hospital

HOUSE SURGEON (20 general surgical beds, 20 thoracic beds, 10 radiotherapy beds), pre-registration, vacant now.

Applications, stating age, experience and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.

35, Grove-road South, Southsea.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. ALEXANDRA MATERNITY HOME, DEVONPORT. HOUSE OFFICER in Obstetrics, vacant 2nd June, 1955.

Applications, stating age, nationality, qualifications, and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

ROCHESTER. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR REGISTRAR (orthopædics) required 1st May for up to 5 months. Recognised trainee post.

Applications, with details of experience and 2 testimonials, to Group Secretary, Medway and Gravesend Hospital Management Committee, 20, Star-hill, Rochester.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required. (Post not approved for pre-registration purposes.)

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male), required from 19th April, 1955. (Post not approved for pre-registration purposes.)

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time non-resident post of SURGICAL REGISTRAR to the Inverness Hospitals.

Further particulars and application schedules can be obtained from the undersigned, with whom applications should be lodged by 23rd April, 1955. A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board, Raigmore, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in Obstetrics and Gynæcology for duties in the Dunbartonshire Area, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 2nd May, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Psychiatry to fill a vacancy in the approved trainee establishment at Bexley Hospital, Dartford Heath, Bexley, Kent. Previous experience in general medicine is desirable. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 23rd April, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for 2 appointments as Whole-time REGISTRAR in Chest Diseases to fill vacancies in the approved trainee establishment at the Brighton and Lewes Group of hospitals, for duty mainly at Bevendean Hospital, Bear-road, Brighton, 1, which is a unit of approximately 150 Beds devoted to the active treatment of tuberculosis, and also at Chest Clinics in the area. Candidates must have had good experience in general medicine and in the diagnosis and treatment of pulmonary tuberculosis in adults. The appointments will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 23rd April, 1955.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) 2 RESIDENT HOUSE PHYSICIANS required in mid-May, 1955. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton, as soon as possible.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required about 20th April. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton, as soon as possible.

SHEFFIELD CHEST SERVICE. Sheffield Regional HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (chest diseases) required with duties mainly at the Crimicar Lane Sanatorium, Sheffield. Post vacant now. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th April, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHREWSBURY HOSPITAL GROUP. House Surgeon for general surgical duties (pre-registration post), vacant 16th May, 1955.

Applications with copy testimonials to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE SURGEON (Orthopædic Department) which is open to pre-registration candidates, and which becomes vacant at the end of April, 1955. The Department has 35 Beds and a large outpatient turnover.

Applications, stating age, nationality, qualifications, experience, and naming 2 referees, to the Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON for a period of 6 months. Post vacant now and is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SWANSEA HOSPITAL, Swansea. Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the appointment of SENIOR HOUSE OFFICER in the Ophthalmic Department of the above Hospital. The post is recognised for the F.R.C.S. (Eng.) and D.O. examinations.

Applications, stating age, qualifications and experience, should be addressed to the Hospital Secretary.

ST. ALBANS CITY HOSPITAL. (378 Beds.) South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time RESIDENT ANÆSTHETIC REGISTRAR required at the above Hospital. Post recognised for the D.A. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts, by 18th April, 1955.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (378 Beds.) Locum Tenens CASUALTY OFFICER required from 28th April to 15th May approximately.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON at Whiston Hospital, Prescot (892 Beds). The post is recognised for Pre-registration Service.

Applications, stating age, qualifications and experience and giving 2 names for reference, should be forwarded to the Secretary, Group Office, Whiston Hospital, Prescot, Lancs, immediately.

STAFFORD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics), Male or Female. Recognised for D.A.

Applications, with copy testimonials, to Group Secretary, 13, Foregate-street, Stafford.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER in Orthopædics vacant shortly.

Applications (2 references) to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (E.N.T.), vacant now.

Applications (2 references) to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (orthopædics) required, vacant now. Post recognised F.R.C.S.

Detailed applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

TORQUAY. TORBAY HOSPITAL. Resident Casualty OFFICER (Senior House Officer status) required immediately. There is a complement of 5 Resident House Officers.

Applications (quoting reference F.955/53), stating qualifications, nationality, age, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay.

WARWICK HOSPITAL. (350 Beds.) Senior House OFFICER (anæsthetics) for duties mainly at the above Hospital. Post vacant, resident or non-resident, recognised for D.A. and F.F.A.R.C.S.

Applications, with names and addresses of 3 referees, to be sent to Medical Superintendent.

WELSH REGIONAL HOSPITAL BOARD. Senior REGISTRAR (E.N.T. surgery), Swansea General Hospital, Swansea (403 Beds). 2 years in the first instance, with a possible extension at the end of that time. Hospital recognised for F.R.C.S. and D.L.O. Non-resident.

Forms of application from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEYMOUTH AND DISTRICT HOSPITAL. (124 Beds.) HOUSE PHYSICIAN required (Male or Female). Post vacant 1st May, and tenable for 6 months. Approved for Pre-registration Service.

Applications, stating age, experience, qualifications and nationality, together with copy testimonials, to Group Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, immediately.

WOLVERHAMPTON GROUP.

Wolverhampton Eye Infirmary (recognised for F.R.C.S. and D.O. examinations)

HOUSE OFFICER, vacant now.

Apply Secretary, The Royal Hospital, Wolverhampton.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds, plus 27 beds in Annexe.) HOUSE SURGEON, with orthopædic and casualty duties. (Recognised pre-registration, Senior House Officer grade if appropriate.) Vacant 1st May.

Detailed applications, with dates and copies of 2 testimonials, to Group Secretary, Workington Infirmary, Cumberland.

WESTON-SUPER-MARE GENERAL HOSPITAL. Resident Locum Tenens CASUALTY OFFICER (Senior House Officer grade) required at the above Hospital for the period 16th April, 1955, to 14th May, 1955, inclusive.

Applications should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee, c/o The Convalescent Hospital, Uphill-road, Weston-super-Mare.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorkshire (229 Beds) SENIOR HOUSE PHYSICIAN. Salary £745.

Detailed applications to Group Secretary.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorks (229 Beds) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply to Group Secretary.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Broadgate Mental Hospital, Beverley, Yorks (650 Beds) JUNIOR HOSPITAL MEDICAL OFFICER required.

Facilities for study. A flatlet is available in the Hospital.

Detailed applications to Group Secretary, Westwood Hospital, Beverley.

U.S.A. ST. ELIZABETH HOSPITAL, Elizabeth, N.J., U.S.A. (250 Beds.) Applications are invited to fill vacancies for 2 INTERNS to serve for 1 year. Hospital approved by A.M.A. Intern training being conducted. Salary $100 plus maintenance.

Apply Administrator.

U.S.A. BRIDGEPORT HOSPITAL, Bridgeport, CONNECTICUT. Approved ROTATING INTERNSHIPS available in a general hospital of 387 Beds and 60 bassinets; approved residencies in medicine, surgery, obstetrics, pathology, radiology, and anesthesiology. Stipend of $190 per month in addition to full maintenance and uniforms. Exchange-visitor programme participant (P–619).

Address inquiries to Chairman, Committee on Medical Education of Interns and Residents, Bridgeport Hospital, Bridgeport, 10, Connecticut, U.S.A.

U.S.A. UNION HOSPITAL, Fall River, Massachusetts, U.S.A. (207 Beds.) Applications are invited for 4 INTERNS to serve for 1 year, starting 1st July, 1955. Rotating Intern training programme approved by the American Medical Association. Salary, $100 per month plus full maintenance, first 6 months; $150 per month plus full maintenance, second 6 months.

Apply Administrator.

Public Appointments

HER MAJESTY'S OVERSEA CIVIL SERVICE Medical BRANCH—SARAWAK. MEDICAL OFFICERS required in Sarawak for general duties. Candidates must possess medical qualifications registrable in United Kingdom and have at least 1 years postgraduate hospital experience. 1 post will be filled by the appointment of a Lady Medical Officer. Appointment on permanent basis with pension (non-contributory) at age of 55, or on short-term contract with gratuity (taxable), assessed at the rate of £37 10s. for each completed period of 3 months, payable on completion of satisfactory service. Candidates in the National Health Service may leave but retain their superannuation rights (up to 6 years) and receive a gratuity (taxable) of 20% of the aggregate of their salary at the end of their engagements. Basic salary scale ranges from $630 to $1080 a month—i.e., £882–£1512 a year (1 Sarawak dollar equals 2s. 4d.). Starting-point in this scale determined according to age, qualifications and experience. Pensionable expatriation pay, £210 a year on salaries up to £1344 a year, and £245 a year on salaries above £1344 a year, is payable and also a cost-of-living allowance varying according to the Officer's salary and family circumstances. Partially furnished quarters provided if available at low rental. Free passages provided in both directions for officer, wife, and up to 3 children under 18 years of age. Income-tax at local rates. Tour of service from 30 to 36 months. Local leave permitted and generous home leave is granted. Private practice not allowed but consultation is permitted.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/24/01).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Gambia MEDICAL DEPARTMENT. MEDICAL OFFICER required for general duties in Medical Department, Gambia. Candidates must have medical qualifications registrable in the United Kingdom and have some surgical experience.

Appointments may be made as follows:—

(*a*) On short term contract (2 tours each of 18–24 months duration) with inclusive salary of from £1098 rising to £2010 (approximately) a year; after completion of contract a gratuity is paid at the rate of £37 10s. for each completed period of 3 months (including leave).

(*b*) From the National Health Service. Candidates may leave the National Health Service but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary. Inclusive salary of candidates so appointed is in the scale £942–£1860 a year.

Starting salary in both cases depends upon qualifications and experience. Quarters provided at low rental. Free passages in both directions for officer, wife, and up to 2 children under 18 years of age. Income-tax at low local rates. Local leave is permissible and generous home leave is granted after each tour.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/12/04).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Mauritius. ORTHOPÆDIC SURGEON required in the Medical Department, Mauritius, for orthopædic duties at the Orthopædic Centre, and to perform such other duties as may be required by the Director of Medical Services. Candidates must have medical qualifications registrable by the General Medical Council in the United Kingdom and the F.R.C.S. or previous experience in orthopædic surgery. Appointment can be made on a permanent basis with pension (non-contributory) at the age of 55, or on contract with gratuity (taxable) for 3 years. Salary scale is Rs.10,740–Rs.19,020 (£805 10s.–£1426 10s.) a year, starting salary depending upon qualifications and experience. In addition a temporary non-pensionable cost-of-living allowance is payable which amounts to 11% on salary not exceeding Rs.12,000 (£900) a year and 8% on salary over Rs.12,000 (£900) p.a. Gratuity is payable after satisfactory completion of contract and is assessed at the rate of £37 10s. for each completed period of 3 months while salary is below £1000 a year and £50 for each similar period when salary is over £1000 a year. Government of Mauritius would pay employer's share of pension contributions (if applicable). Quarters are not provided, but officers who have not been allocated Government houses will be reimbursed any difference between approved rent paid for a private house (subject to a maximum of Rs.250 (£18 15s.) a month) and the 10% salary they would normally pay for a Government house. For this purpose, officers residing in hotels or boarding houses will be regarded as paying half the board and lodging charge for themselves and their wives in respect of rent. Income-tax at local rates. Free passages in both directions are provided for officer, wife and children not exceeding 5 persons in all. Generous home leave is granted after each tour of 3 or 4 years.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/52/018).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—KENYA. SPECIALIST PSYCHIATRIST required to be in charge of Mathari Mental Hospital, Nairobi, which has 500 Beds. Candidates must possess medical qualifications registrable in the United Kingdom and a Diploma in Psychological Medicine. Appointment can be made on a permanent basis with pension (non-contributory) at age of 55, or on short-term contract with gratuity payable after satisfactory completion of service. Salary in scale £2000–£50–£2100 a year. In addition a temporary cost-of-living allowance of £162 a year is payable. Quarters may be provided at rental of 10% of salary or an allowance payable in lieu. Free passages in both directions for officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 40 to 48 months. Educational facilities are available.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/7/016).

BIRMINGHAM. CITY OF BIRMINGHAM. Public HEALTH DEPARTMENT. Applications are invited for the temporary appointment of 3 Whole-time MEDICAL OFFICERS in the Maternity and Child Welfare Department to take holiday duty during the summer months, commencing 6th June, 1955. The appointments are non-resident and the salary offered is at the rate of £18 4s. 5d. per week. Successful applicants are expected to remain, if required, for a period of 6 months.

Application forms obtainable from the Medical Officer of Health, Council House, Birmingham, 3. Completed forms to be returned to him, with copies of 3 testimonials, not later than 30th April, 1955.

LANCASHIRE COUNTY COUNCIL. Divisional Medical OFFICER required for Health Division 15, Eccles. Applicants must be medical practitioners holding D.P.H. or equivalent qualification and with administrative experience. Will be required to act as Medical Officer of Health to County Districts within the Division where they so desire. Basic salary £1300–£50–£1700, with substantial increase if appointed Medical Officer of Health to 1 or more County Districts. Appointment superannuable and subject to passing medical examination.

Full particulars and application forms from County Medical Officer (Serial No. 49), East Cliff County Offices, Preston, returnable by 26th April, 1955.

LONDON TRANSPORT. Applications are invited from registered medical practitioners for a post of MEDICAL OFFICER. The successful applicant will be responsible to the Chief Medical Officer for general clinical work and the medical supervision of working conditions. Commencing salary £1400 p.a. The appointment is subject to a medical examination. On completion of a satisfactory probationary period, the selected applicant will be expected to join a contributory superannuation scheme.

Applications, giving full details of qualifications and experience, together with the names of 3 referees, should be sent within 14 days of the appearance of this advertisement to the Staff Officer (F/EV.524), London Transport Executive, 55, Broadway, S.W.1.

NATIONAL COAL BOARD. Applications are invited from registered medical practitioners for a full-time appointment as MEDICAL OFFICER to the West Fife Area. Duties will embrace the usual functions of Industrial Medical Officers. Candidates should have had experience in general practice and/or in the field of preventive and industrial medicine. Knowledge of the Coalmining Industry will be an advantage. Salary will be within the range of £1250–£1900 p.a. according to qualifications, age, and experience. The post is superannuable and the successful applicant will require to pass a medical examination.

Applications, giving full particulars of age, qualifications, experience (in chronological order), present appointment, and salary, together with 3 references, should be sent to the Establishments Officer, 1, Eglinton-crescent, Edinburgh, 12, within 7 days. Original testimonials should not be sent.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

HAZEL GROVE, CHESHIRE. Vacancy due to retirement. List approximately 920. Intermediate (urban) area. Duties commence 1st July, 1955. It is not yet known whether the present house and surgery will be available and intending applicants are advised to take into account the possibility of having to provide alternative accommodation. Apply on Form E.C.16A by 22nd April, 1955, to the Clerk of the Cheshire Executive Council, 28, Nicholas-street, Chester.

MOORENDS, near DONCASTER. Applications are invited for a general medical practice VACANCY in rural mining area. List at present approximately 2800. Modern dwelling house and separate surgery accommodation available for purchase. Apply on Form E.C.16A to the undersigned, from whom further particulars and forms may be obtained. Closing date for applications 18th April, 1955.

C. H. STABLER, Clerk,
Yorkshire West Riding Executive Council.
5, St. John's-north, Wakefield, Yorks.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies.

THE CHRISTIAN MEDICAL FELLOWSHIP

2 House-parties have been arranged: 6th–9th May at the Belsfield Hotel, Windermere, and 20th–23rd May at Linden Hall Hydro, Bournemouth. These annual House Parties, limited to Medical Practitioners and their families, have for some years served as a focus of Christian fellowship within the profession.

Details from the Secretary C.M.F., 39, Bedford-square, London, W.C.1.

Institute of Child Psychology Ltd., 6, Pembridge-villas, London, W.11. Applications invited for Consultant Child Psychiatrist. 2 sessions weekly for clinical work and post-graduate teaching. Candidates must hold D.P.M. and have experience of Child Guidance work.—Apply, with names of 2 referees, to the Secretary.

Certified Pathologist to handle work in two 150-Bed General Hospitals in Northern Saskatchewan city of 20,000 population. Expected remuneration $10,000–$12,000 p.a., plus limited outside work.—Address, No. 122, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

American Pathologist, certified by the American Board of Pathology, serving 250-Bed general hospital and County laboratory, is interested in exchanging positions for a 6-month period with a British Pathologist having similar situation.—Address, No. 118, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Parke, Davis & Company Limited, require a medical man not over 40 with some literary ability for their Medical Service Department. Duties will include medical correspondence, compilation and editing of literature, and in due course some lecturing. The post is progressive and pensionable. The commencing salary will be not less than £1000 p.a., depending on knowledge and ability.—Apply in first instance for application form to Personnel Manager, Parke, Davis & Company Limited, Staines-road, Hounslow, Middlesex.

Medical Officer required for Middle East by large Oil Company; preference for those with overseas experience and some knowledge of tropical work. Age about 35 and preferably single. Total emoluments nct less than £2000 p.a. (incremental) with no income-tax at present. Paid home leave after 2 years; pension fund.—Write quoting No. 379 to Box No. 8533, c/o CHARLES BARKER & SONS LTD., 31, Budge-row, London, E.C.4.

Plastic Surgeon wanted, well qualified and trained, who would be interested in immigrating to the United States and taking out citizenship papers. To be associated with a large mid-western plastic surgery Clinic. Guaranteed minimum of $10,000 per year net. For right person, $25,000 net income with 2–3 years is assured. Must spend 6 months in Rotating Internеship to fulfil requirements for State Laws. Private practice devoted entirely to plastic surgery—growing rapidly. Senior partner retiring. Write all particulars, including references and type and extent of general surgical training and when you would be available.—Address, No. 105, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wanted, Wimpole-street area, consulting-room and room suitable small laboratory or share of laboratory facilities.—Address, No. 120, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists.—SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM. 5329/0504).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Medical books, old, rare, out-of-print. List free.—Walford, 186, Upper-street, London, N.1.

For sale, equipment for G.P. Steriliser, forceps, bags, &c. —KENsington 0146.

Swiss Doctor's widow wishes to stay with family 3–4 months to improve English, willing to assist household or practice duties, available June.—Address, No. 121, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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